AMATEUR TELEVISION QUARTERLY

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Volume 6 #2 Spring 1993
April, May, June

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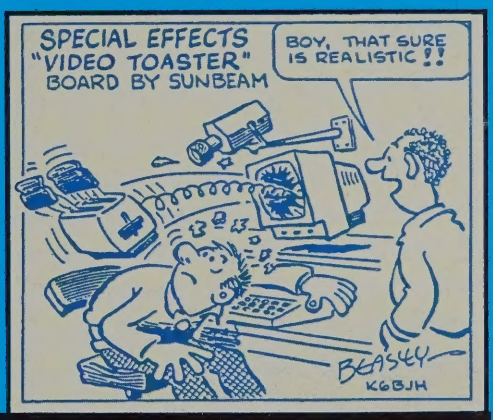
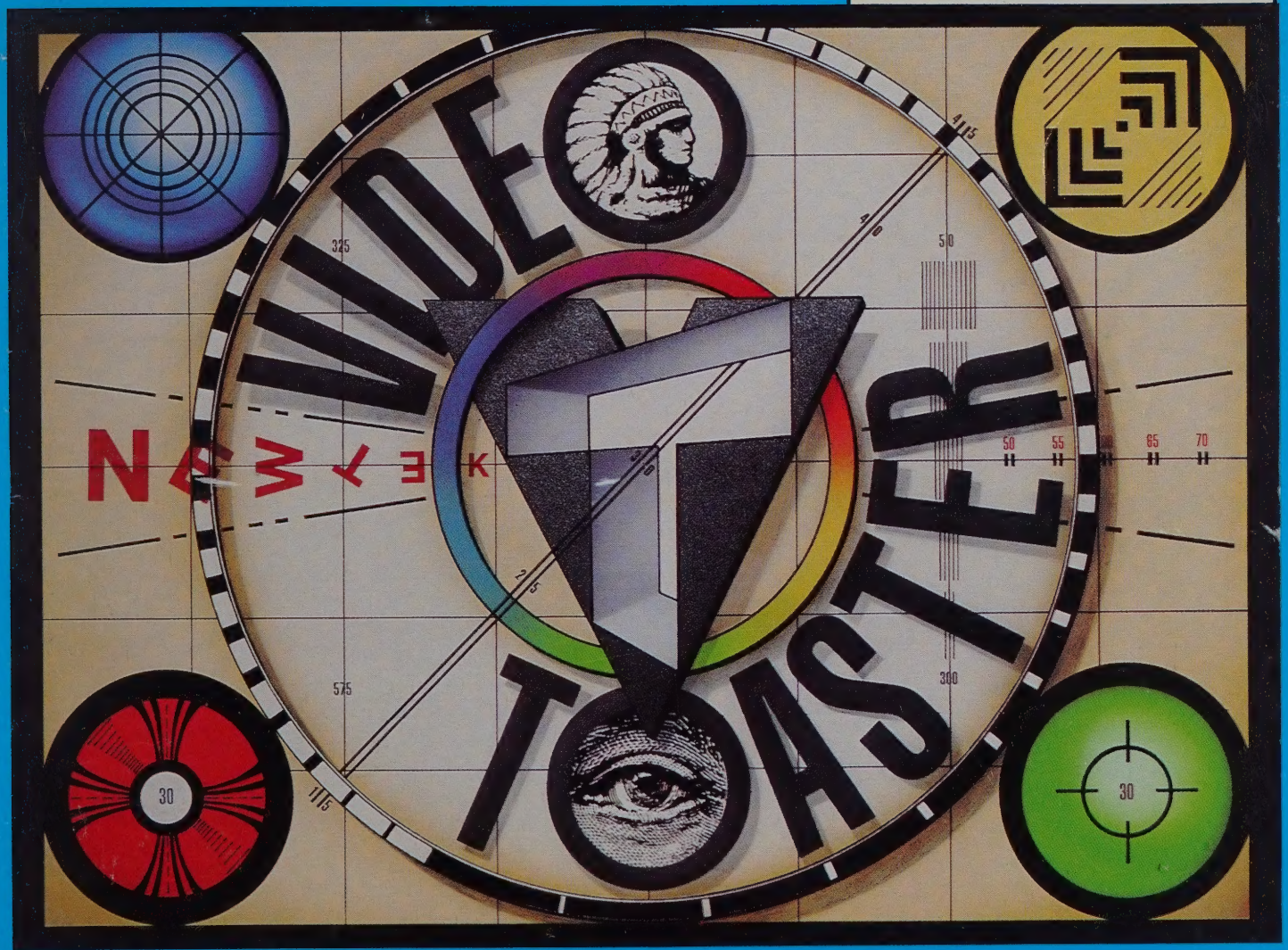
DAYTON BOOTH 619

INSIDE THE TOASTER
INSIDE ATV EQUIPMENT
DAYTON PREVIEW





£30 000 gold TREASURE for YOU to find in QUEST

A solid 18ct gold jewel box is the unique handcrafted prize in our treasure hunt competition. Created by goldsmiths who work for Royalty, it measures 15cm x 10cm and contains over 1000 grams of gold worth more than £30,000 !!!

QUEST is an exciting illustrated Treasure Hunt book!
QUEST is a competition full of fascinating rhyming clues!
QUEST is an entertaining game of skill for everyone 15+!
QUEST contains all the clues needed for YOU to WIN!
QUEST is FREE TO ENTER .... using the Form in the book!

FOR YOUR CHANCE TO WIN SEE COUPON INSIDE OR CARD HOLDERS PHONE OUR HOTLINE

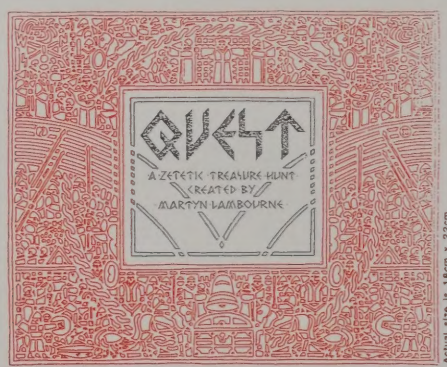
QUEST is only £15 all inclusive.... Get one for YOUR CHANCE TO WIN !!!

Abridged Competition Rules Competition closes 21.6.94 unless no correct claim is submitted, when it shall continue until such time. Competition entrants must be 18, unless with parents or guardians permission. Winner will be notified and result published nationally following end of competition. There is only one correct solution. Result will be determined by tie-break if more than one correct answer. Copyright of entries remains with entrants but Tree House reserve the right to use same in publicity. No entries will be returned. There is no alternative to the Prize, cash or otherwise. Winner will be required to take part in an Award Ceremony and related publicity. Full Rules printed in QUEST book.
QUEST published by TREE HOUSE, PO Box 1968, Burnham-on-Crouch, Essex, CM0 8QU

Join the QUEST for this golden TREASURE

QUEST is an exciting illustrated Treasure Hunt book!
QUEST is a competition full of fascinating rhyming clues!
QUEST is an entertaining game of skill for everyone 15+!
QUEST is a fine collector's quality Library Edition!
QUEST is printed on beautiful vellum style paper!
QUEST is elegantly bound in silk cloth with a gold title!
QUEST will give everyone hours of educational fun!
QUEST will perplex Wordgame and Crossword Puzzlers!
QUEST will challenge Mystery and Detective readers!
QUEST clues can all be answered without leaving home!
QUEST contains all the clues needed for YOU to WIN!

QUEST makes a beautiful and ideal present for everyone!
QUEST is easier than it looks .. once you've got the idea!
QUEST is FREE TO ENTER .... using the Form in the book!



Actual size is 16cm x 22cm

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Can YOU solve the clues and find the true answer?
Can YOU miss the traps and pitfalls along the way?
Can YOU finish your Quest at the right place?
Can YOU be the one to claim the golden prize?
Can YOU win the jewel box?

Pit your wits against me !!!
Challenge me NOW !!!

Buyers of the QUEST book are under no obligation to enter the competition nor to distribute promotional material.

The solid 18ct gold jewel box is the unique handcrafted prize in our treasure hunt competition. It is an outstanding example of the time honoured craft of the Goldsmith. Created by craftsmen who work for Royalty, its base measures 15cm x 10cm and it contains over 1000 grams of solid gold! It is worth over £30,000 !!!

QUEST is not just a Treasure Hunt! It is also a way for YOU to share in profits from the books we sell, just by giving out leaflets. It can be done by EVERYONE! Many businesses can profit too! Just display a poster and let people take your leaflets! There's no selling, no stock, and you don't get anyone to join. We look after all paperwork, sell books by mail, and send you your share of profits each month! Full details will come to you with your own copy of QUEST!

Yes!

☐ Please send me ..... copies of QUEST for £15 each (£17 overseas)

My Name is ☐Mr ☐Mrs ☐Ms .....

I live at .....

.....

.....

.....

Postcode.....

☐ I enclose payment for £ ..... made out to TREE HOUSE (please put your address on the back)

☐ OR please debit my ACCESS / VISA / MASTERCARD / DEBIT CARD with £ .....

Signed .....
Card Number

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Expiry Date

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NOW SEND THIS COUPON WITH YOUR PAYMENT TO :

Dept B, 'TREE HOUSE', P O Box 2, Dedham, Colchester, CO7 6HP

OR CARD HOLDERS CAN ORDER BY PHONE

0206 322 822

Please tell us if you don't receive your book within 28 days. Full refund if you're not satisfied.

Please tick here if you don't wish to receive information on any other products by mail ☐

Reference ATVQ

QUEST treasure hunt competition book published 1.9.92 by TREE HOUSE, PO Box 1968, Burnham on Crouch, Essex, CM0 8QU.

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ATVQ

AMATEUR TELEVISION QUARTERLY

V6 #2
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Reader comment: My copy of Vol 6 #1 arrived today. The cover was "out of this world." Could you provide a comment or explanation about the cover or perhaps I missed it in the article. I truly do not believe that you can realize just how many ATV'ers, hobbyists, enthusiasts, hams you have helped to become PROUD of their phase of the World's Greatest Hobby. Bill W8DMR.

REPLY: The color covers (front and inside back) were credited in the article on page 60. The photo was from the Spectra III ATV balloon flight and the Franklin HS requested and received free copies for the students who participated. This month's cover was courtesy of Newtek Inc of Topeka, KS and introduces the article by Terry Churchfield. The Cartoon is by Robert Beasley K6BJH Layout is by Henry KB9FO using Aldus publishing programs, HP Scan Jet IIc and HP color Deskjet 500C and HP Laser Jet III. The issue is word processed in Wordperfect 5.2 and layout is done in Aldus Pagemaker 4.0, Freehand and Photostyler. The computer is a Northgate 486-66 filled to the brim with hardware and software (1.5 GBytes). How's that? Thanks for the kind words. As you know I also work a full time job and this has always been a hobby activity to promote and protect an aspect of Ham Radio that Bill and I enjoy.

pauldon ASSOCIATES

DAYTON BOOTH 319

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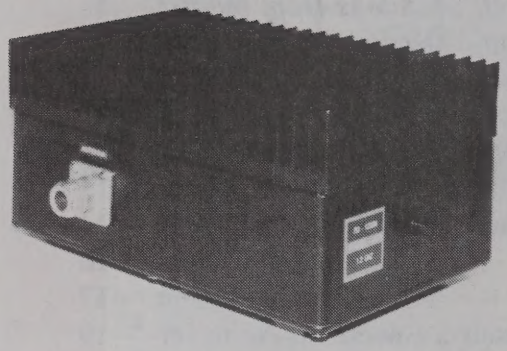
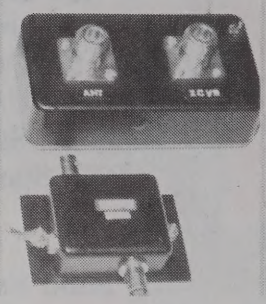




BRICKS: NEW P.C. BOARDS & SCHEMATIC INCLUDED
SAU-11 902-928 Mhz. for FM use or ATV at reduced output ½ W. = 10 W. $25.00
W57762 1.2 Ghz. Linear use for FM, ATV, or SSB. 18 W. ½ W. = 18 W. 99.00
SAU-4 420-450 Mhz. (Linear) ½ W. = 18 W. 81.00
M57745 420-450 Mhz. (Linear) ½ W. = 35 W. 120.00
OTHERS — INQUIRE.

POWER AMPLIFIERS:
426-450 Mhz. (Linear) T/R Switched
PD-440N P.A. ½ W. drive (T/R) =18 W. output. We custom build for your input $119.00
SAME WITH PREAMPLIFIER 145.00
PD-440N-1 ½ W. or your request output = 35 W. T/R 155.00
PD-440N-2 ½W. drive = 75 W. output T/R 285.00
NOT T/R SWITCHED (For Repeater Use) 10 W. = 80 W. 199.00
ABOVE: Large Heat Sink & Diecast Box
PD-440N-3 10 W. drive = 80 W. output T/R 235.00
ALL OF THE ABOVE USE POWER GAIN BLOCKS

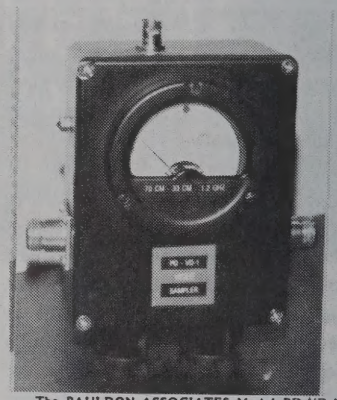
MINI POWER AMPLIFIER FOR 420 - 450 Mhz.
PD-440N (Mini) 100 MW. = 2 W. & ½ W. = 6 W. $85.00
PD-900N 902 - 928 Mhz. ½ W. = 10 W. output FM or ATV with reduced power 65.00
PD-33LP 902 - 928 Mhz. linear P.A. ½ W. = 7 W. output (2 stage) 119.00
PD-33HP linear P.A. 7 W. = 18 W. output 116.00
ABOVE are for 906 to 928 Mhz. band
PD-33VLP linear P.A. ½ W. = 1.5 W. out 49.00
PD-33VLP-1 P.A. for the (33 cm.) band 1 Mw. = 8 W. output 123.00
CAN BE USED FOR THE MINI POWER DRIVERS that are commercially available for home TV. Separate receiver and transmitters (EX: VC-2000)
P.A. for 1.2 Ghz. band
PD-1200N P.A. 1 W. = 18 W. (linear) $165.00
PD-1200N-1 P.A. 2 W. = 36 W. (linear & diecast) 285.00
DUPLEXED POWER AMP. for 70 cm. & 2 meters
PD-270-1 2-4 W. drive on either band = 35 W.
FM on 2 meters & FM or SSB on 70 cm. band 265.00

ATV DOWNCONVERTERS
GaAs Fet transistor used in both the 70 cm. & 33 cm. models TV channel 3 or 4
Tunes from 420 - 450 Mhz.
Board & all parts wired $60.00
Mounted in cabinet 73.00

Downconverter for the 902 - 928 Mhz. band TV channel 3 or 4
Board & all parts wired $68.00
Mounted in cabinet 80.00
Mounted in a diecast box 88.00

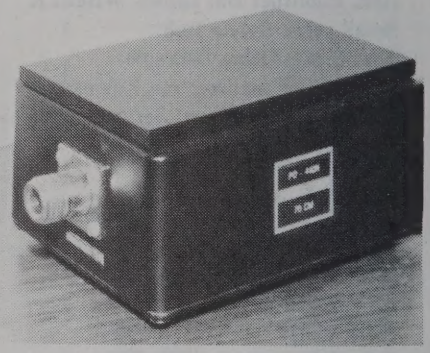
PREAMPLIFIERS
PD-440S 70 cm. 426 - 450 Mhz. preamplifier is a SINGLE GATE type using either a NEC 2SK-572 or a Mgf 1302 transistor. Noise figure is 0.6 db. and has a gain of 16 db. or better. It operates from a 12 - 13.8 volt supply, is diode protected and has a 5 volt regulator for stability. The source leads are by-passed with disc capacitors and the input uses a high "Q" piston Trim Pot. The output is not tuned so that the noise figure is consequentially low. A Toroid is used in the output, with capacitor coupling to the output. In this model either BNC or "N" connectors are used. $51.00
PD-440TRL is a tower mounted 70 cm. preamplifier whose description is similar to that of the PD-144TR-L except has "N" connectors 150 Watt thru capacity 119.00
FOR VOLTAGE FEED THRU COAXIAL CABLE 150 Watt thru capacity 129.00
PD-900 is a 902 - 928 Mhz. preamplifier with a noise figure of 0.6 - 0.7 db. and a gain of 14 to 16 db. with BNC .. 65.00
"N" Connectors 70.00
PD-900TR is an R.F. sensed preamplifier and can be transmitted through with a maximum power of 20 W. 119.00
PD-1200 — SAME AS THE PD900 except 1.2 Ghz. ..... 65.00 and 70.00
PD-1200TR 1.2 Ghz. preamplifier with R.F. sensed T/R switching (20 W.) 119.00
PD-2300 is for the frequency range of 1.8 - 2.4 Ghz. (No T/R Switching Capability) 72.00

OTHER PRODUCTS AVAILABLE: FM TRANSMITTERS AND RECEIVERS, SAMPLERS (VIDEO), Etc.
CALL OR WRITE FOR ADDITIONAL INFORMATION OR CATALOGUE.



The PAULDON ASSOCIATES Model PD-VD-1 ATV VIDEO SAMPLER unit picks up your transmitted Fast Scan TV signal by sampling the transmission line with near negligible insertion loss. It employs 2 Type 'N connectors for input and output connections. The furnished BNC mentioned on the top of the unit is used as a video output port, useful for connections to a CCTV monitor or scope (for adjusting proper video and sync levels). Transistors included in the electronic circuit design are: Q1-ECG 123, Q2-ECG 123 and Q3-ECG 159.

$63.00,



INTERDIGITAL FILTERS
PD-1002 439.25 MHZ.
$150.00
PD-1004 910.25 MHZ.
$145.00
7 pole, 7 adjustable tuning rod design. Freq. adjustable to 6 MHZ. by rotation of the screws at the end of each rod. Insertion loss less than 1db. Out of band attenuation 80 db. +/12 mhz. from theVSB passband.Atten. at the LSB sound sub. carrier 30db.
OTHER FILTERS AVAILABLE
WRITE OR CALL

DID YOU SEE QST?

In our last issue we put a little tease, asking you to check out the April issue of QST. Well, you will see the ATV article by Ralph Taggert WB8DQT if you do. But wait, there's more! The article is in three parts, so more is to come in the May and June issue of QST.

Now sharp eyed ATVQ readers should get a serious case of deja vu'! The pictures for the series were provided from ATVQ, selected from those YOU sent in as part of your articles and news! Yes, we confess, we have been helping QST. We received a call for HQ asking for help. We were more than happy to provide it! I've a nice thank-you card here and you will notice some in-print thanks as well. We sent over 50 photos for QST to choose from and the April issue has a great selection from what we sent.

Feeling flush with pride, we have a small ad for ATVQ in April QST (page 128) and will have a 1/4 page ad in the May issue.

FOR SALE CLASSIFIED ADS

FOR SALE: Ventek NTSC output card, also SVGA with Tseng 4000 software and manuals. like new. $200 Save $150! KD0LO, 314 469 3120.

Robot Research's HyperScan™ System Capable of Transmitting High-Speed High-Quality Photos via Phoneline Radio or Cellular Links

SAN DIEGO -- Ordinary personal computers can now receive high-speed, high-quality video picture transmissions using the HyperScan™ system from Robot Research Inc.

In as little as a fraction of a second, the HyperScan system can transmit via regular phoneline, radio or cellular links and the Integrated Services Digital Network (ISDN) pixel perfect pictures to an IBM or compatible PC with a VGA monitor.

According to John P. Stahler, Robot Research president, the applications for the system are almost endless.

"We see the HyperScan system being used extensively by the security, engineering, architectural, medical, banking, insurance, publishing, education and military communities -- anyone needing to share high-quality visual information in a matter of seconds," he said.

Robot Research's HyperScan system consists of the new TX40 digital picture transmitter, RX40 digital picture receiver disk, and high speed, error-correcting modems.

"The HyperScan technology will revolutionize performance and system integration during the 1990s and beyond," he said. "Taking the computer out of the product box and putting the product box into the computer lifts our technological limits to the heights of our imaginations."

Robot Research Inc. is an international leader in the field of digital video products and CCTV control systems for the security and other industries. Located in San Diego, Robot Research manufactures a complete line of Multivision™ quad picture processors, digital and analog picture transmission systems, time lapse sequencer and CoaxControl™ camera control products.

ROBOT LEAVES HAM MARKET

1969-1993

Since the early days of SSTV, Robot has been a fixture in ham video. From the early days of the model 70 and 80 SSTV system through the 400, 800 and 1200C, Robot had been the dominant leader in SSTV. The early days of SSTV were underwritten by the founders of Robot, who were also hams, took annual losses and financed the business out of their own pockets. This did not come to light until the original owners died and it was discovered that they were using their personal finances to continue production of ham products as a price well below the commercial equivalents.

In the past several years, computers have taken over much of the ham radio domain. Nowhere has this been more prevalent that in SSTV where the use of the Amiga and other personal computers with powerful graphics programs and import/export utilities allowed easy manipulation of figures and text. The Robot 1200C was a stout color SSTV system, but with little promotion, a relatively high sales price (compared to cheap computers which could do much more) and the sharing of software coupled with the development of alternative SSTV operating modes cut sales of the 1200 to 2 per month, according to Robot management. Thus the decision was made to discontinue the Amateur equipment line. The last of the 1200's was sold a few weeks ago.

Robot Research - A World Leader in Design & Manufacture of Phoneline Video Surveillance Equipment

SAN DIEGO -- Robot Research is a world leader in the design and manufacture of phoneline video transmission equipment and digital quad picture processors for a variety of security surveillance applications.

The video surveillance industry is growing steadily with sales to dealers increasing by 11-14 percent a year. Robot has more than kept pace, reporting 1991 sales of $6.7 million and projecting 1992 sales of $9.2 million. The company expects international sales to account for about 15 percent of its 1992 volume.

In April 1990, Robot acquired San Diego-based VCS (Visual Communication Specialists), a manufacturer of switching and control systems. Former VCS products have been integrated into the Robot product line.

Robot's line of transmitters, receivers, quads, controls and timelapse sequencers are sold under the company's own label and those of original equipment manufacturers such as Sony, Burle and Phillips.

NEW AT Q & DAYTON ATV

Bring your lookie talkie!

Hamvention Forum Saturday 2:45 Room 3

The Saturday Hamvention ATV Forum, hosted by **Tom O'Hara W6ORG** will feature an ATV shootout of Lookie-Talkies. This is a show and tell open to anyone who has built a lookie-talkie. Featured speakers will be **Dave Clingerman W6OAL** and his topic will be ATV at the Edge of Space, with **Jack Crabtree AA0P. Bill Parker W8DMR**'s topic is Turned On TV, getting started in ham TV.

Friday night, 7 PM. Holiday Inn North, ATVQ party in the main ballroom. Our usual gathering of outstanding presenters of ATV activity. If you miss this, you've missed Dayton! I-75 at Wagoner Rd.

Saturday night, Mike Donovan WB0JAW will host the Spec Com ATV gathering at 7PM, Ramada Inn North, 4079 Little York Rd. Exit 60 on I-75. Topics will cover computer, fax, SSTV and sat tracking.

New At Q

The four horses of the apocalypse have left town.

At the suggestion of **Terry Churchfield, K3HKR**, we made a number of changes in the Q's production. Sylvia was sharing the HP scanjet IIc to capture and enlarge photos for her art customers. She also wanted a color printer so she could print color photos in color (seems reasonable) rather than using the HP laserjet III. The Q office has been in the basement of the home QTH, along with the hamshack. I wasn't able to get the new DX array finished last year before it got too cold to work outside, there is still 1 antenna to assemble and then tune and paint all and make coax coupling cables and erection of the array. Meanwhile, winter set in, work at the TV station picked up and a lot of stuff I wanted to do got put on hold. After all the issues take precedence over everything else except work. Now arrive the four horsemen of the apocalypse. I had the October and January issues 95% done when my knee which was operated on a couple of years ago began giving me big time grief. So I was back on crutches for weeks and unable to get up/down the stairs to get to the computer to work. After several weeks of waiting for the knee to mend again, I tried to get down the stairs to the computer to get the issue done. Well, I got October out and was walking up the stairs when my knee ripped apart again.

So Sylvia suggested we move the stuff upstairs. Yeah, like I was about to move half a ton of hardware, books, files, etc up from the basement. Sylvia rented a day labor and they cleared out the back bedroom, moving most of it to the 2nd floor rooms, used mostly by her cats and her artwork studio. We threw out a couple of extra beds to make room and sorted through lots of stuff you tend to accumulate but never use and threw it out too. That included two Ampex 1200 VTR's which amounted to 3000 pounds of scrap metal and electronics. The neighborhood garbage pickers took them away in less than 20 minutes after they were pieced out and put on the trash pile out front. Recycling works!

So to make a long story short, the back bedroom is now the computer room/offices. Sylvia insisted on a computer of her own, and the color printer. So now she uses the 486-33 and I use a new 486-66. We are both using the Laser Jet and Color Desk-jet printers through some share boxes, and share the color scanner.

To do her artowrk and make the Q look better we also invested in a slew of new software. My PC (now grown to near mini main frame) has dual floppies, a 1.2 GHz SCSI HD, a second 250 Meg IDE HD, CD Rom, tape backup and every card slot is filled. Thirty two meg of memory keep most things running but Sherlock Holmes takes too much of the 640 K base RAM (TSR's are in the way) to run. Sylvia's is the same system but still in a desk top form without the tape drive and SCSI, but has everything else. A long way from the Tandy 1000EX 8088 machine the Q started with!

Meanwhile, to transfer the data we had the mailing service transfer all the Q files to DB Four, and the mailing list is well over 5,000 now. **Do we have your latest ATV roster?** Now is the time to update us with your latest list of local ATV'ers. We have a **new 8 page FULL COLOR catalog** of ATV books and magazines which you will see at Dayton, we would like to send them to help them have more fun on ATV.

Well, back at the doctors, while checking out the knees he suggested a full physical as well. Good thing too. The doctor found five small tumors in the colon near the appendix. So another slice and dice session and they were out and fortunately they were benign. No cancer here!

I thought things would be over by then, but I managed to come down with pneumonia and was flat on my back for five more weeks. I'm allergic to Penicillin so the doc had to use his third and fourth and fifth choices. I wasn't alone, the station owner also caught it and lots of folks at work had severe bronchitis. Not a good winter in Chicago.

Well, it did give me time to complete the January, February, March issue! The cover was digitized from the Spectra III flight photos, composited using Aldus' set of three Desk Top publishing programs, and printed on the HP color Desk jet and sent to the printer as a full composite with knockouts and separations. The interior was also done in Aldus programs including Pagemaker, Freehand and Photostyler. Likewise, we are using the same software/hardware for this issue. Terry Churchfield was right, the photos do come out better than in Wordperfect,. that has been upgraded to 5.2, which I still use as the word processor prior to Pagemaker.

After getting the issue done and to the printer I turned my attention to Dayton. I must have missed the fine print because I thought the March 1 deadline was for booth reconfirmations, turns out it was January 1. Not to worry, we are still going to have a booth there, but in **a new location. The ATVQ booth this year is #619,** where ever that is! Just look for the spotlights we always use to illuminate our booth. If I get time I will also try

put together a new ATV promo video. We have one now where I dx the DARA balloon and show how to find the signal using SSB, 2 meters, then video and what a preamp does for your reception, both inside and mast mounted. Its a great video for club meetings and public demos. Copies are only $6.50 post paid (a 30 minute program). The tape was edited and shot on Hi-8 (47 edits) with titles, digital special effects, intro and close.

Hey, do you have any VIDEO TAPE OF ATV ACTION?? Here's a chance to add to our public library of ATV tapes, maybe be included in our ATV demo tapes and show your stuff! Send them in (any format) and I will dub them to Hi-8 and send them back to you. The stuff Bill WB8ELK has shot over the years has gotten to too many generations to be good quality video, so lets update the world about ATV.

The CD Rom became necessary, along with the 1.2 Gbyte SCSI drive as I've added a zip ++ program to help the mail. The program is supposed to have every address in the US with updated zip plus 4 plus 2 plus carrier route. If you look at your mail label most of you will find this printed there. About 3% of the addresses weren't recognized by the program automatically but I found most manually, so as time goes by and I have a few spare moments (enough to pet the dogs maybe?) I'll get the rest done. The post office said we still couldn't save any money on postage with the added info but delivery should be faster after it gets to the local post offices. We'll see!

Your taxes at work! HA! I'll reserve my Clinton jokes for now. I did check with the paper boy, he can cash my check after the Clinton taxes take the rest. ATVQ has always employed a professional mailing service to do the bulk mailings (second and third class). For the last issue, the serviced called and said the post office, which had insisted we put non US delivery issues in envelopes, now wanted to charge extra because of the weight of the envelopes. The issue weighs 7 ounces but with an envelope weighs 8 and the Post office was SURE they were losing money because the envelope copies were included with the non envelope copies. They made the mailing service open every mail bag (about 70) to pull out the envelope copies, then re-do the entire mailing form into two separate forms, one for enveloped copies and one for non envelope copies. Guess what? When the mailing service was done re figuring the postage, it was $50 LESS! The US Snail (not a typo) LOST $50 thinking they would make an extra $5 for the weight of 150 envelopes. Bulk mail goes by the pound, and if you are even .1 ounce over any # pound, its the next pound rate, likewise if you are at # pounds and 15 OZ, it is till # pounds.

Speaking of bulk, I had our printer run off two years supply of mailing stuff which brought the cost per piece down by 66%. That will save us a little on the cost of future issues and catalogues and handouts to help off set the 50% increase in Clinton Taxes I expect to see over the next two years. Don't blame me, I voted for Rush Limbauch & Perot!

Well, this issues puts us back on time and the next issue should be on time too. Meanwhile don't forget to send in your news, articles, construction projects, for the future of ATV.

Are we on your club newsletter mailing list? Check with your club secretary and make sure we are. We send special news items directly to clubs for their use if we know who the club newsletter editor is and we receive the club newsletter.

MEGA WATTS

The most commonly asked question in our mail is, "where can I get a high power amplifier for ATV?" The answer is: HENRY RADIO. I contacted Henry Radio over a year ago after a less than satisfactory 3CX800 based UHF amp. They agreed the amp had some problems. This was reinforced by letters and calls from other users as well. HENRY has now told us they expect to offer TWO NEW UHF AMPS by summer. One based on a single tube design will offer about 1200-1400 watts out for ATV (Mike WA6SVT has seen it on display in LA) and a two tube design using 2, 3CX800's said to produce full legal power output and also passing ATV. Not cheap but an amp this big for UHF never is. Both are said to run class AB for SSB, ATV and class C for FM, CW. Input is said to be 5 to 40 watts. With my M2 antenna array it should produce about 1 megawatt ERP here! (H pol) My 2 meter array and amp should produce about 300 KW erp. (V pol) I'll be looking for **your** DX signal this year!

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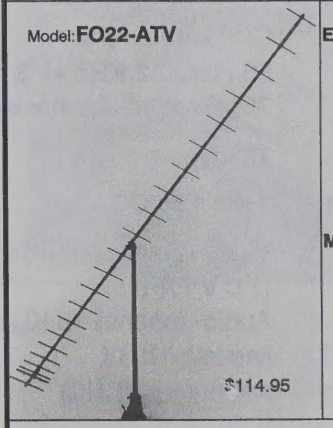
THE HIGHEST GAIN ATV ANTENNA YOU CAN BUY!
Model: FO22-ATV

MEASURED GAIN >15.8 dBd



ELECTRICAL SPECIFICATIONS:
Gain bandwidth ..... 420-450 MHz
VSWR .... < 1.33:1 415 to 450 MHz
E-Plane beamwidth ..... 23 Deg.
H-Plane beamwidth ..... 24 Deg.
Sidelobe attenuation
1st E-Plane ..... -17.5 dB
1st H-Plane ..... -15.5 dB
Maximum power ..... 1500 Watts
F/B ratio ..... 22 dB
Impedance ..... 50 ohm

MECHANICAL SPECIFICATIONS:
Length ..... 14 Ft.
Boom ..... 1" OD 6061 T-6 Al
Elements ..... 3/16" Al rod
Mast ..... up to 1.5" dia.
Wind surface area ..... .78 Sq.Ft.
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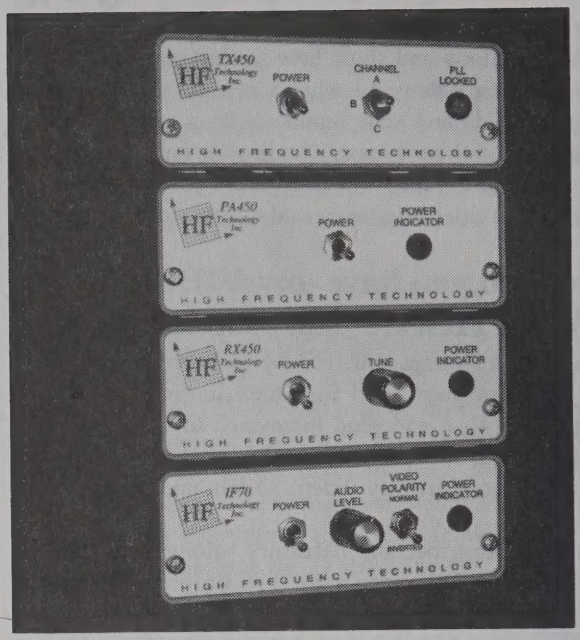
RX 450	$149.00
IF 70	$184.00



TX 450
FM Video transmitter

Frequency of operation:	3PLL Synthesized user selectable channels 420-440 MHz
Emission type:	FM, NTSC Video with subcarrier audio (5.8 MHz)
Deviation Video:	+/- 4 MHz Peak
Subcarrier:	+/- 25 KHz Peak
Video bandwidth:	50 Hz to 4.0 MHz CCIR pre-emphasis
Audio bandwidth:	50 Hz to 12 KHz +/- 3 dB 75 uSec pre-emphasis
Output power:	70 mW
Power supply voltage:	11 to 15 VDC
Rear panel inputs:	Video- (phono) 75 Ohms (1.0 V P/P) Audio- (phono) >5 KOhms line level input
output:	RF Output- (BNC)
Front panel:	On/Off switch, channel select synthesizer lock light

RX 450
AM / FM Downconverter

Tuning range:	>420 MHz to 440 MHz
Noise figure:	< 2 dB across band, unconditionally stable
Power supply voltage:	11 to 15 VDC
Rear panel:	RF input (BNC) IF output (F-connector) Connect directly to TV for AM reception, or connect to IF 70 for a high performance FM system

IF 70
FM Video IF/Demodulator and Subcarrier receiver

IF input frequency:	70 MHz nominal
IF bandwidth:	15 MHz
Subcarrier detect range:	5.8 MHz to 6.2 MHz
Dynamic range:	-80 dBm to 0 dBm
Rear panel:	IF input (F-connector), Video Output (phono) 1V P-P, Audio Output (phono) line level or speaker (8 Ohm)

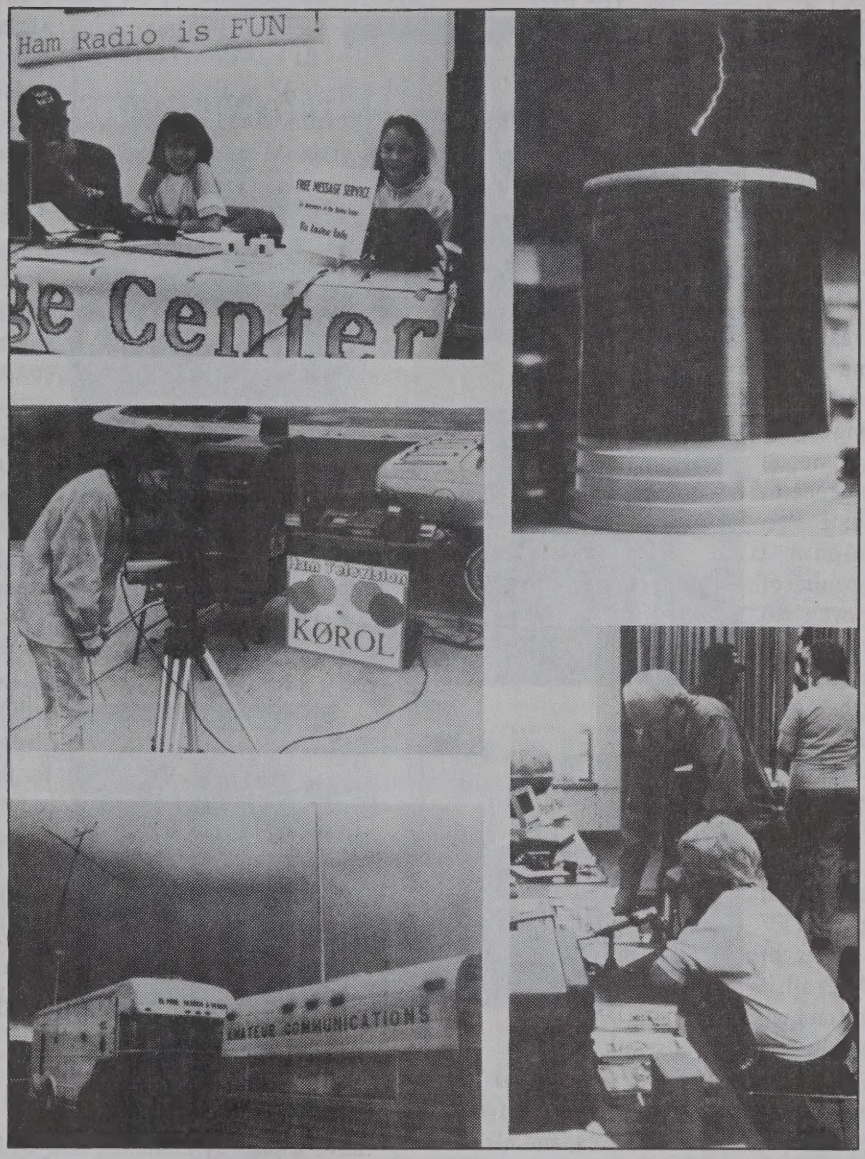
Also available: PA 450 5 W FM ATV amplifier @ $ 149.00...Complete line of 1296 MHz FMATV equipment: TX 1300 FMTV transmitter @ $ 289.00; RX 1300 1296 ATV downconverter @ $259.00, for use with the IF 70 for FM or for AM applications. All equipment packaged similar to photographs.

For information or to place orders phone: 708 885-9021 VISA,MC accepted. To order by mail or to inquire for more information write to HFT Inc. 509 Washington Blvd. Hoffman Estates, Il. 60194. Please add $5.00 for shipping and handling, Illinois residents add 7.5% sales tax.

HIGH FREQUENCY TECHNOLOGY INC.

Ham Radio at the Library

Zero Beat, December 1992



The PPRAA, in cooperation with the Pikes Peak Library District, put on an impressive display of all phases of amateur radio on Saturday, October 31 at the East Library, 5550 Union Boulevard. It was a real success due to the enthusiastic participation of more than fifty club members and friends of PPRAA. The show ran from 10 am to 4 pm and was viewed by hundreds of library patrons in spite of the unfriendly weather that moved into town in the early afternoon.

Ron NKP's Tesla coil performed just fine for six hours straight and was a great attention getter at the library entrance as was the sailplane which the Pikes Peak Soaring Society (one of our participants) had hanging from the ceiling nearby. The Edge of Space Sciences display provided some early morning TV pictures from their balloon launch in Longmont and it was a popular exhibit with visitors all day long. Once again Oak Stockton K0ROL's amateur radio TV station attracted lots of attention as most library patrons were unaware of this aspect of ham radio.

The Message Center in the able hands of Rosie, WAMNL and Jake, NCYR provided valuable experience in message handling for some of our younger members. Faye, KBQI and Connie, KAPXE were a real credit to the YLISSB and along with Ralph, KAMTX and a few others kept our HF station active. The Pikes Peak Soaring Society provided another form of interest to our visitors particularly with the huge sixteen foot sailplane they had suspended from the ceiling in the middle of the room where our displays were exhibited.

El Paso Search and Rescue brought Comm 1 to the show. This is one very impressive piece of automotive communications equipment. I'm afraid it didn't get seen by too many people and the fault is mine as I did not sufficiently inform Search and Rescue as to the set up of the show. We'll do better, much better, next year. Tom, NNTX brought his AMSAT station and provided another aspect of ham radio that most visitors were unfamiliar with. A real surprise was REACT, an organization that has its roots in CB (yes, that hated CB) but they set up a first class display and made some of us think that maybe our club should consider spending a little money to help our public service arms such as ARES and RACES with some professional signs and backdrops.

I think most agree that the club put on a pretty good show and that we can do even better next year. I have already asked the library for a Saturday in September and nicer weather will certainly help with attendance. But for now a big round of applause for all those members and friends who willingly pitched in to make our day at the library so successful.

Submitted by Al Craig, N2IWZ

Photo Captions

Jake NCYR with two Baxter's, Megan and Emily NOPR (top left).

Search and Rescue's Comm 1 and our Stephie KBEZG assisting Oak KROL. Every TV station needs a pretty girl (center left).

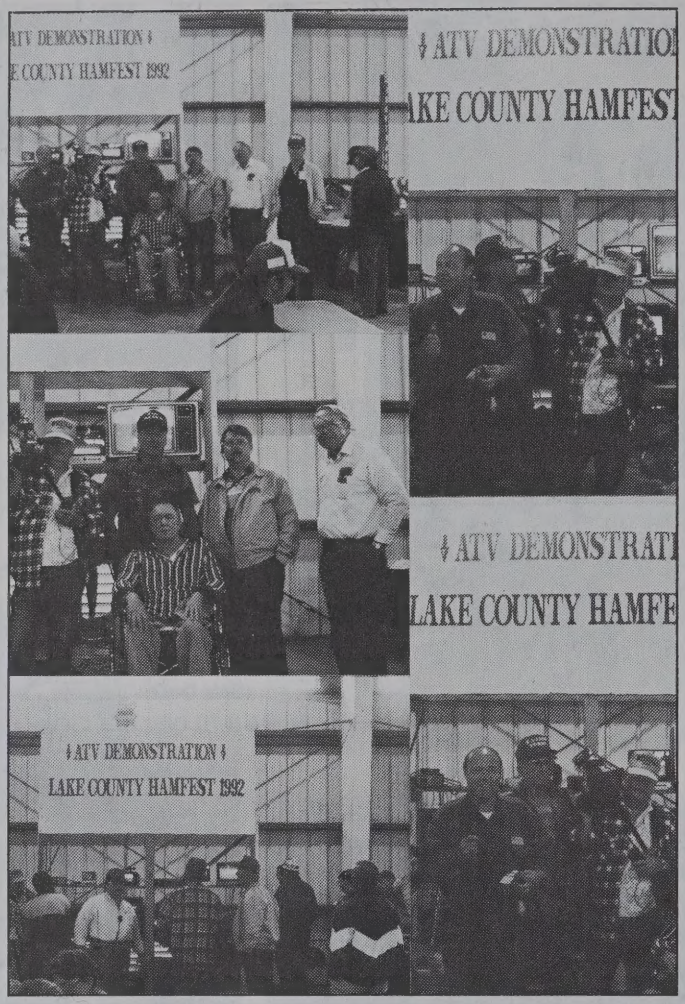
Own club trailer (bottom left.)

Ron NKP's dependable Tesla coil, a great attention getter (top right).

Faye KBQI and John Kremer (awaiting his license) working the HF station, Jake NOCYR and Ora NQJX in the background.

ATV Demonstration at the Lake County Hamfest

The Lake County Hamfest is an annual event at which about fifty vendors attend as well as another hundred tailgater's in the outside lot. It is a small to medium hamfest with an attendance of about a thousand people.



During one of our Wednesday night ATV nets, Carl K4IDL suggested that we put on a real show for the people who come to the hamfest this year, so it was decided we do just that. That evening during the net we got organized, someone was to make the sign, someone to build a display stand, get extension cords... the list went on and on until we had a pretty good idea in mind of how things would be; we even had an antenna and rotor lined up. Now, we needed volunteers to set it up and man the station during the event. This didn't take too long to get either, as we were all anxious to do it and wanted to make a good impression on Hams who had never seen ATV before.

The big day came and so did the rain but that didn't stop the ATV crew nor dampen the spirits of anybody at the hamfest. After all, it was a month in the making and we were all too excited to let a little drizzle upset us.

Antennas were set up the night before. The stand put together early in the morning and soon the transmitters, receivers, downconverters, VCR's, preamps, cables, monitors, and all the other equipment began to arrive. At first things were a bit chaotic but soon they cam together in a mixture of sounds. We had video rolling on monitors, voice on two meters, audio subcarriers sounds scratching in the background. Things were coming to life! Then just like magic there was a live TV shot on 900 Mhz being displayed on one of the monitors! As people turned around to see where it was coming from, they could see John (WB9SUJ) walking around with a portable transmitter on his shoulder. What a great impression that made. At the same time a VCR was showing footage of the Daytona Beach Balloon flight. There was also a monitor displaying the weather radar retransmission from the Daytona Beach Repeater. All this was enough to attract even the most benign Hams visiting the hamfest.

Holding down the fort at the demo table were Carl K4IDL, Don W4PLA, Terry KA4ZOS and Steve AC4KN. Soon other ATVers were standing around the area talking and making friends with each other.

There were people we had seen and worked live but had never met in person, it was great fun to hear them tell one another about remember when?? and how's about that band opening last fall? Did you see how well the repeater is doing since we last worked on it? Soon some of the non-ATVers were gathering around asking very difficult questions about preamps, signal bandwidth, antenna connections, amplifiers, sync pulses, etc., which were all fielded by our panel of experts and explained in great detail. In general, it was a very useful demonstration for the hamfest and we have been invited back again next year. We will have a few more tricks up our sleeves and an extra contact or two for the next one.

I would like to encourage others to set up these types of demonstrations at their local hamfest. They are relatively easy to do and does not take a whole lot of planning. Just set up a station like you do not have at home; bring a VCR along to show things you've taped from your station, have a catalog or magazine to show some of the available equipment. Ask a couple of friends to help with extra gear and manning the table. Remember at a hamfest you have a pass-by audience and will be speaking to them on an individual basis. The setups like these are nice attractions for hamfest and help boost attendance as well as promote more people getting into ATV. Once they see how easy it is to get into the receive mode, you will have more checking into your net and soon transmitting video.

I think next year we will feature a "starter station" which will have a home brew antenna, home brew preamp, and a cable-ready TV. All set up on a table for people to examine.

In general, you could say they came, the SAW and they liked. Thanks for all the help of the Central Florida ATV Net, and all the other ATV amateurs who took time to participate, and a special tribute to Carl K4IDL who tore down his entire shack to make it possible.

See you there next year, 73 de AC4KN Steve Eshom.

ATV in Monterey, CA

by Doug McKinney KC3RL

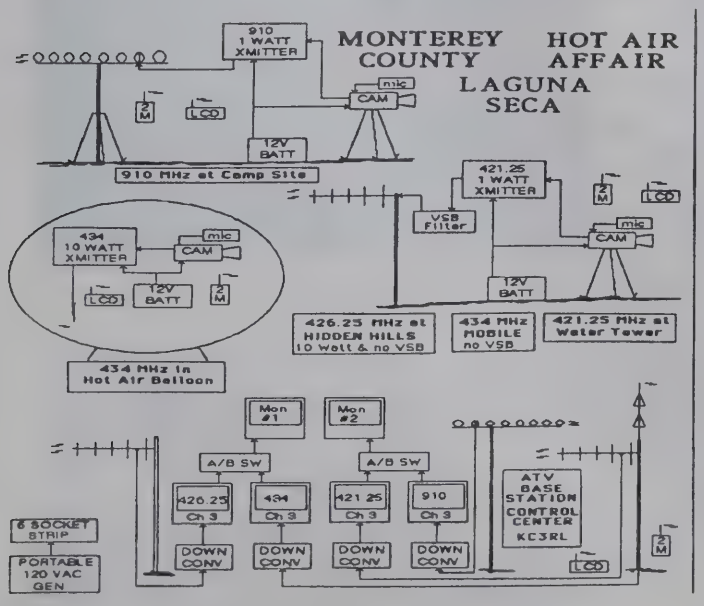
This article is about how sharing ATV equipment evolves into the ability to support major public service events. In Monterey we have two major events; The Big Sur International Marathon and The Hot Air Affair. These two events are significantly different in complexity and illustrate what I call the serial and parallel modes for ATV public service support.

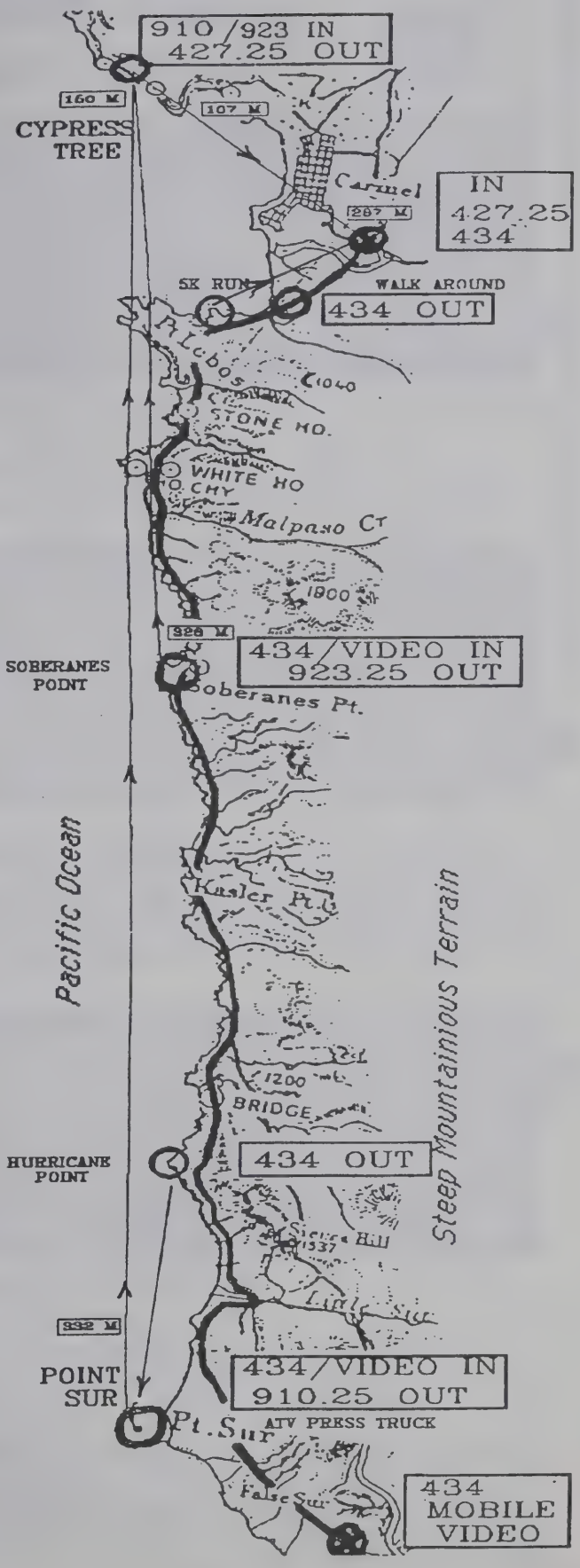
The portable public service ATV group in Monterey was started by Doug McKinney KC3RL in 1987. Prior to that time ATV in the region was a base station activity. Doug came to Monterey from Washington D.C. where he had developed expertise in portable ATV public service through work with the Metrovision ATV Club (see chapter 16 in the ARRL Operating Manual).

In 1987, a group comprised of Doub KC3RL, Elliot KB3LY and Don KB6BZL began to use portable ATV equipment at small 5K runs. These small events generated enthusiasm and within two years the group had grown to six ATV operators supported by extra equipment loaned by the original group of three. Having extra portable ATV transmitters, antennas, downconverters, coax, masts, etc., resulted in greater opportunities for other hams to operate ATV systems. The benefits of having extra ATV equipment to loan out are that you have someone else at the other end to receive your picture!

Today we have nine ATV operators with equipment and eleven trained operators without ATV equipment. In addition, we have coordinated with the South Bay Amateur Television Club members to help with events (in particular Don KK6MX and Renie KC6NBS). Santa Clara Red Cross ATV coordinator, Bob KB6FEC, has been very helpful by loaning ATV equipment for those without equipment. Bob's equipment loans have not only helped us, but also has helped a brand new ATV group in Alameda County, spearheaded by a dynamo ATV public service coordinator, Sue KC6WXO.

Our ATV public service group has two main purposes; audio and visual communication to help assure public health and safety and to give operators experience that would enable them to be ready to assist in any disaster. These two major events in the Monterey area provide distinctly different coordination challenges and learning experiences. CONTINUED>>>>> page 67





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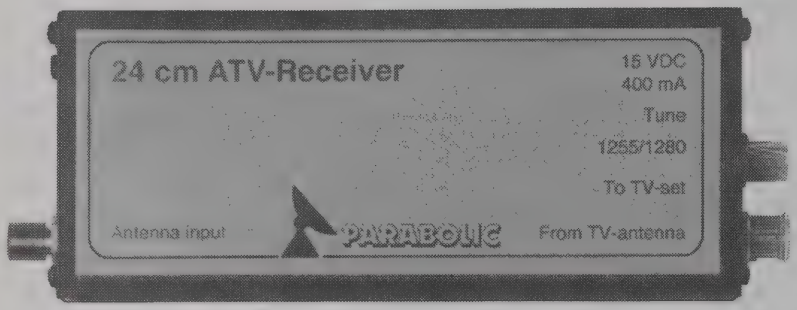

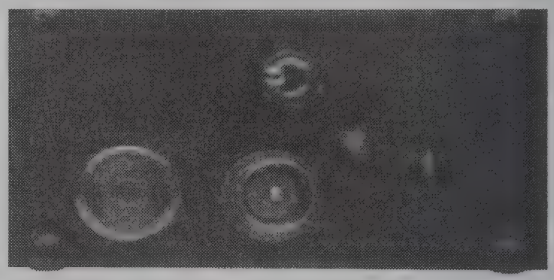

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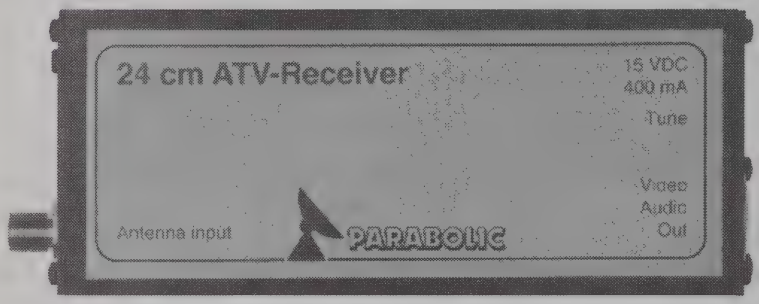

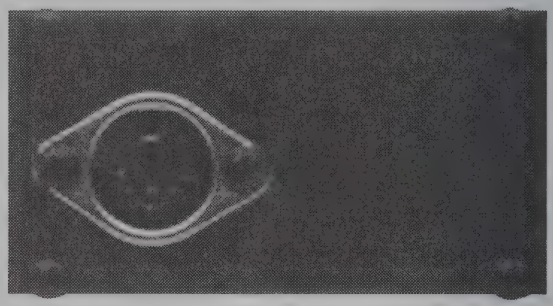

Same receiver with Video and Audio outputs.
Will tune approx. 1200 to 1500 MHz.
Both receivers deliver voltage for a preamp through the coax cable.
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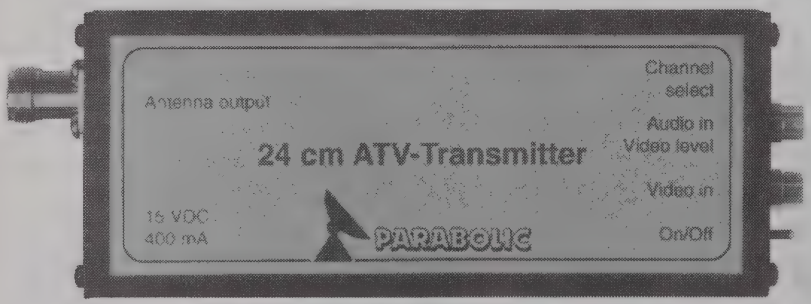

200 mW FM-transmitter that tunes between 1240 and 1279 MHz in 1 MHz steps. Will drive the M57762 to about 10W. One year guarantee.
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All modules use 15VDC max 400mA (incl. preamp) but 13.8VDC is OK. The transmitter will work as low as 10VDC. A preamp with 1,0dB NF and 40dB gain is also available at $169.
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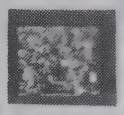

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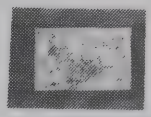

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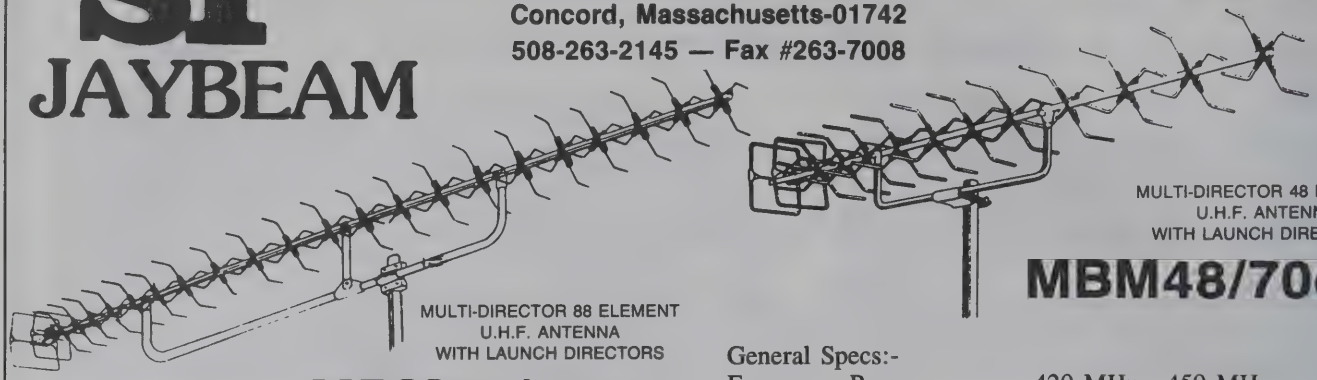

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MULTI-DIRECTOR 48 ELEMENT
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WITH LAUNCH DIRECTORS

MBM48/70cm

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WITH LAUNCH DIRECTORS

MBM28/70cm

	MBM48	MBM88
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Boom Length	6 ft	13 ft
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Loss (typ)	0.1 dB	0.1 dB	0.15 dB	0.2 dB	0.25 dB	0.25 dB
	$200.00	$160.00	$105.00	$125.00	$125.00	$125.00

Model	PSf421-ATV	PSf426-ATV	PSf439-ATV	PSf910-ATV	PSf1253-ATV
Loss (typ)	2.0 dB	2.0 dB	2.0 dB	2.5 dB	3.0 dB
Std conns.	BNC	BNC	BNC	N	N
	$155.00	$155.00	$155.00	$180.00	$180.00

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Announcement

National Balloon Symposium, sponsored by EOSS (Edge of Space Sciences). Conference to be held on Aug. 20, 21, 22. at Denver International Airport Holiday Inn. Program will be about amateur radio ballooning. Groups are expected to attend from around the country.

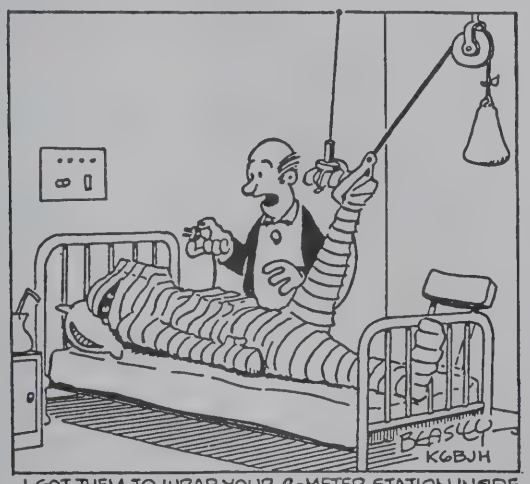
Schedule:

Friday evening: registration and show & tell. Video tapes begin at 6 PM

Saturday, beginners forum and papers during the day. The program is now seeking persons to speak, deliver papers, show payloads.

Saturday evening: banquet and awards presentations. Sunday, practical workshop and launches!

Speakers are still being sought for this event. If you would like to make a presentqation or speak, contact: Merle McCaslin W0YUK, 376 W Caley Cir, Littleton, CO 80120. The Holiday Inn is located at I-70 at Chambers. Phone 303 731 9494. Registration fee is $48 which includes lunch and banquet.



I GOT THEM TO WRAP YOUR 2-METER STATION INSIDE THE TAPE, STEVE, BUT IF THEY DON'T HAVE A GOOD GROUND HERE, SHE MAY TINGLE WHEN I PLUG IT IN!

Manistique, MI

The "93" U.P. Hamfest is July 30-31, 1993 at the Schoolcraft County Fair Building, Manistique, MI. We are having a setup on Friday afternoon, Friday Nite Fish Fry and get together. Saturday will run from 6:00 am to 5:00 pm Registration is $5.00, Table Space $5.00 per 4'. For more information, contact WD8IBT - Debra K. Barton, evenings at 906-341-5694 or write M.A.R.A., PO Box 144, Manistique, MI 49854.

THE FOUNDATION FOR AMATEUR RADIO, INC.,

SCHOLARSHIPS

a non-profit organization with headquarters in Washington, D.C., plans to administer forty-seven (47) scholarships for the academic year 1993-1994 to assist licensed Radio Amateurs. The Foundation, composed of fifty local area Amateur Radio Clubs, fully funds five of these scholarships with the income from grants and it annual Hamfest. The remaining forty-two (42) are administered by the Foundation without cost to the various donors.

Licensed Radio Amateurs may compete for these awards if they plan to pursue a full-time course of studies beyond high school and are enrolled in or have been accepted for enrollment at an accredited university, college or technical school. The Awards range from $500 to $2000 with preference given in some cases to residents of specified geographical areas or the pursuit of certain study programs. Clubs are encouraged to announce these opportunities at their meetings, on their nets, during training classes, and in their club newsletters.

Additional information and an application form can be requested by letter or QSL card, postmarked prior to April 30, 1993 from:

FAR Scholarships
6903 Rhode Island Avenue
College Park, MD 20740

The Foundation for Amateur Radio, incorporated in the District of Columbia, is an exempt organization under Section 501(c)(3) of the Internal Revenue Code of 1954. It is devoted exclusively to promoting the interests of Amateur Radio and those scientific, literary and educational pursuits that advance the purpose of the Amateur Radio Service.

Kantronics KAM Now Has Pactor, the Newest HF Digital Mode

Pactor, available as an option for the Kantronics KAM, is the newest digital mode for HF data communication used world-wide throughout the amateur radio community. Developed by German Amateurs, this mode combines many of the best features of Packet and Amtor, providing greatly increased data throughput on noisy and unpredictable HF bands. Pactor operates at either 200 or 100 baud and, depending on existing band conditions, automatically selects the initial baud rate and then adjusts it as required during a link. For more effective throughput, Pactor also features Huffman encoding. Like packet, Pactor uses a 16-bit code to ensure error free data transfer between stations, even under adverse HF conditions. Utilizing memory ARQ, incorrect frames can be combined to form a good frame, eliminating the need for "perfect" reception, and Pactor offers optional long path connections which allow users to establish links with stations around the world. The Pactor firmware option for the KAM is available as an eprom chip to replace existing firmware. Contact your nearest authorized dealer or Kantronics at 1202 E 23rd Street, Lawrence, Kansas 66046, (913) 842-7745 or fax (913) 842-2021.

Minutes of the Ad-Hoc Spectrum Management Committee February 20, 1993 Nashville, TN from ARRL

1. The Committee was called to order on February 20, 1993, at 9:00 am at the Music City Sheraton, Nashville, Tennessee by the Chairman, Marshal Quiat, AGOX.
2. Members in attendance included directors Joel Harrison WB5IGF, Fried Heyn WA6WZO, Steve Mendelsohn WA2DHF, Vice Directors Kay Craigie WT3P and George Race WB8BGY. Also present was ARRL President, George Wilson W4OYI.
3. The Committee reviewed the process of developing ARRL-recommended band plans, how it had arrived at its previous recommendation and why it was not well received by the repeater coordination community.

   After a brief flurry of negative response following the Committee's previous recommendation, no other response was heard.

   Chairman Quiat reported that he contacted Mr. Ken Ennenbach of the Mid-America Coordinating Council (MACC) to solicit input to further committee work, but that Mr. Ennenbach, despite his best efforts, could elicit none.

   The Committee agreed that each band should be viewed as a unique entity for band planning purposes. The Committee also agreed that, for purposes of discussion, only spectrum above 50 Mhz would be considered.
4. The Committee turned its efforts towards redefining the process of band plan development and why it has failed in the past. A sample process was discussed as follows;
   a) An initial position would be published for the affected community to consider and respond to.
   b) If there is a substantial reaction to the published position, identify the leadership of those with strong positions and have them meet with the special ARRL committee in an effort to make sure all opinions are considered.
   c) Conflict and passionate argument by various proponents in an issue may lead to a better solution in a face-to-face meeting. Such synergy has worked in a positive manner in the past.

   Because criticism comes from outside the ARRL infrastructure does not mean it is necessarily either valid or invalid. All input should be carefully evaluated.
5. When band plan changes are suggested in the future, the Committee recommends the following process be used;

   First, the need for band plan change is identified and, if judged to be a serious issue meriting further consideration, validated as justification for change. The community is then advised of the issue and it input solicited.

   The President, on recommendation by Board motion, would then appoint an Ad-Hoc committee with a specific charter including what output the Board expects of the committee.

   Microjustification must be part of an Ad-Hoc committee's report process so future committees can understand how decisions were reached.

   Each conclusion reached must have a clearly defined rationale. When the League publishes a prospective band plan it needs to have better explanations or narratives of those plans.

   The Ad-Hoc Committee report must contain a clearly defined rationale of the action being proposed by the Committee. This rationale will be published along with any prospective band plan, so that the Amateur community fully understands the League position.
6. The Committee identified the Board's charter to its VHF Repeater Advisory Committee as a problem. The charters are too vague.

   Advisory Committees need to find better ways to get reaction from the affected communities.
7. The Committee was in recess from 10:40 to 11 am.
8. The Committee recommends that the League seek agreement within the affected community rather than seek spectrum management through requests to the FCC.
9. The Committee was in recess for lunch from 12 to 1 pm.
10. The Committee reviewed the respective Standard Operating Procedures of the VRAC and V/UAC and agreed that both needed to be redefined and combined into a different type of committee whose function would include digital activities as well as traditional VHF/UHF Repeaters, weak signal and ATV interests. The Committee voted 5 to 1 to recommend dissolution of the VRAC and VUAC and formation of a single committee in its place. Directory Heyn voted to retain the present committee structure.
11. The Committee recommends that this new committee have no band-planning functions, as such, but would make a recommendation to the Board that a band-planning process should be started. The ARRL Board would make the final determination.
12. There are current inter-mode conflicts starting to appear that neither the VRAC nor V/UAC can solve as currently chartered.
13. The Committee was in recess from 2 pm to 2:10 pm.
14. The Ad-Hoc Committee recommends that the new committee have sixteen members, one from each division and Canada. Each division would continue to have one vote as is currently constituted.

    Each director would have the option of creating a divisional group of advisors representing various operating disciplines or modes. This group would have as many members as desired by the director. The director then designates a chairman of this divisional committee, who serves as the division's national advisory committee member and casts the division's vote when necessary.
15. Committee should represent all functions of the VRAC and VUAC and include all modes.
16. When a problem in concerning a particular band is perceived, the new committee would recommend to the Board that an Ad-Hoc band planning committee be formed. The recommendation would include justification for forming such a committee, modes, user groups and frequencies affected by the proposed change in band structure.
17. The Committee adjourned at 4:10 pm. Respectfully submitted, Stephen Mendelsohn, WA2DHF as Secretary

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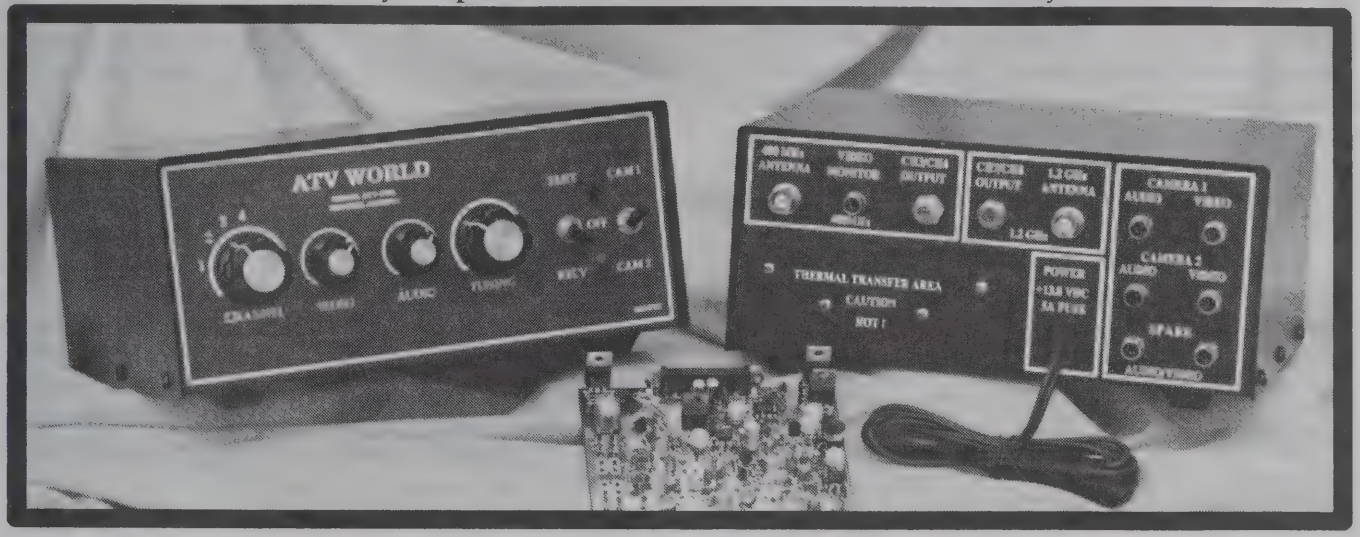

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RX-9-AT	89.95	900 MHZ DOWNCONVERTER CH. 7/8 RF OUTPUT	ASSEMBLED AND TESTED
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RX-1-AT	89.95	1200 MHZ DOWNCONVERTER TO CH. 7/8 RF OUTPUT	ASSEMBLED AND TESTED
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Letters:

There are two features that I enjoy in other magazines that you don't have. One is a reader letter column where readers can say that you are the best thing since sliced bread or complain about your rag, or comment on articles you print, etc. The second is a classified ads column having low rates to non commercial readers or whatever group you want to pick. I enjoy these columns in other magazines and they might generate more interest in your magazine. Heru W3WVV.

Ed Reply: Classified ads for subscribers are FREE. Perhaps you missed something in the past issues: There are news pages in every issue (7 pages in the last issue, 7 in the issue before that, 6 pages in the issue before that...) If we printer every laudatory letter we receive, we wouldn't have room for the rest of the stuff that everyone thinks is great!

"Springfest '93"

New Jersey hamfest

The Shore Points Amateur Radio Club is pleased to announce "Springfest '93", its 11th annual "hamfest"/electronic flea market, to be held on Saturday, March 6, 1993, in Absecon, New Jersey. This is the only "hamfest" we know of that will be held in the Atlantic City area this year. The hamfest will primarily be held indoors, and we expect to draw from the more than 2,000 licensed amateur radio operators, as well as other electronics enthusiasts, in the southern New Jersey region. We are located within convenient driving distance of the greater Philadelphia area, as well as northern Delaware and central New Jersey, and we expect to also draw some attendees from these regions.Bob Webb, WA2YSA Advertising Chairman "Springfest '93"

FREQUENCY COORDINATION

I would like to find out if it would be possible to obtain information on ATV bandplans. SERA is interested in working with all users of the spectrum and rely on input from organizations and users in order to formulate or modify existing frequency utilization plans. I was told that you had published a bandplan in your spring 1992 issue. Specific recommendations would be appreciated so that we can review our bandplan and make some changes as necessary.

I am also enclosing a copy of our current plan. We are having a Board of Directors' meeting in January 1993 and would like to update our plan, if necessary. If you would like to give me a call, please feel free to do so at (912) 987-3000 (evenings) or (912) 929-1454 (days).

Ed. Reply: We have always promoted that the purpose of coordination was to accomodate all users with a minimum of mutual interference. No one bandplan works everywhere especially on 420-450. If the various mode users can agree on a workable plan then that is the best you can provide. Just be sure all mode users can be accomodated. Because of interference from FM mode users in the 440-444 MHz section, many areas are now using 434.00 for ATV or 439.25 lower side band which covers the same frequencies: 434-439 MHz.

TEXAS HAMFEST

Abilene, Texas will again be the site for the **ARRL West Texas Section Convention** and the **Key City Amateur Radio Club Hamfest** May 1-2, 1993.

Abilene is centrally located between Dallas/Fort Worth, Midland/Odessa, Lubbock, Wichita Falls, San Angelo, Austin and San Antonio. We will be mailing our flier to and inviting amateurs from all of these cities.

We expect at least 1000 amateur radio operators, prospective hams and others to attend this two day event. Last year's event was a huge success and we expect this year's to be even better.

We would like to invite a representative of Amateur Television Quarterly to join us and exhibit your products or services available.

Prearranged setup for dealers and manufacturers will be Friday, April 30, from 4:00 to 9:00 pm. Setup for all others including dealers arriving late will begin at 6:00 am Saturday, May 1. There will also be breakfast served Saturday morning for a small charge.

For information and table reservations, feel free to call me at (915) 672-8889 (leave a message, your call will be returned), or contact me by mail, Peg Richard, KA4UPA Hamfest Chairperson

440 Mhz Frequency Utilization Plan

420.00 -	426.00	ATV Repeater w/421.25 Video, Control Links, Experimental
426.00 -	430.00	ATV Simplex w/427.25 Video Car.
430.00 -	431.00	Digital/Packet
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432.07 -	432.08	Propagation Beacons
432.08 -	432.10	Weak Signal CW
432.10		Calling Frequency
432.10 -	432.125	Mixed/Weak Signal
433.00 -	435.00	OSCAR Inputs
435.00 -	438.00	International Satellite
438.00 -	444.00	ATV Rpt w/439.25 Video/Rpt. Links
442.00 -	444.975	Repeater Outputs
445.00 -	447.00	Aux/Control Links, Simplex
446.00		National Simplex Frequency
447.00 -	449.975	Repeater Inputs

ATV STATION ON A BUDGET

Terry Churchfield K3HKR

Here are a few tips and some odd tricks for the ATV operator who needs to maintain a budgeted station.

1)You want to get onto ATV. You have not decided about your downconverter or your transmitter. You are not sure you will be able to see anything on ATV.a)Make it easy on yourself. The CORTLAND model CT500, 5" color TV set is a perfect solution.

First; It is available mail order for about twice the price of a well manufactured downconverter. This means that if you have to purchase two downconverters because of both 23 and 70 cm work in your area, you have paid for the TV set. Second; it can be adjusted to receive both 23 and/or 70 cm. Third; It can go mobile without the need for carrying your downconverter along. Fourth and final; the XYL will not "bark" as much when she understands that it can go along on the next vacation and be used as a very good babysitter in the back seat. All these arguments alone are good reason; however, get this, it has both audio and ideo in/out jacks provided. You can use it with your VCR, C64 or Amiga and the camcorder.

I am using it for my "primary" ATV receiver. I am doing very well with 2 Rutland arrays and my Pauldon preamp. The local (27 air miles away over rough terrain) 23 cm repeater is P5 with full color. The local 70 cm beacon (just put on the air 1 week ago) is P4 off of a Down East loop yagi and no preamp. The beacon is running 1 watt.

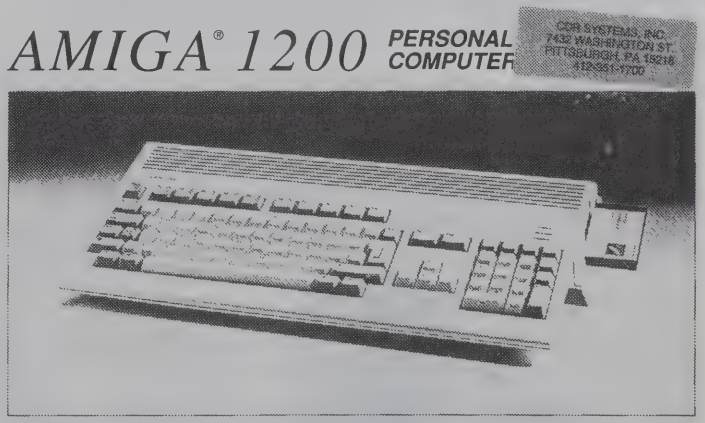
The CT500 is available from the Damark catalog. It has a 100 percent satisfaction guarantee. Get it! Try it! If it does not do the job, send it back! The simple adjustment is done to the "U V" variable pot located under the CRT on the left hand side of the chassis while you face the set. There are four pots there. The correct adjustment is to $802. (These numbers may differ from unit to unit.) Remember use of a good yagi, feedline and matching stub (50 ohm to 75) will make all the difference.

2)Looking for an easy way to connect 1/4 inch copper jacket hardline to BNC connectors?? Use the Radio Shack connectors 278-117 and 274-711. These connectors are adapters for Motorola male to fit BNC jack. The later number is the Motorola plug. The 1/4 inch hardline will fit snug into the Motorola connector. The Motorola plug will go into the BNC connector. You may solder the connectors or just plug and unplug as needed for many other uses. This simple configuration can save you about $15.00 according to the latest Pasternack catalog. PE3874 (12 inches) catalog price: $18.50, 50 ohm RG-400/142 BU.

3)Looking for a 1/4 inch "N" connector (male) for a quick fix? The Radio Shack number 278-151 works perfectly. Simply take a "good" 1/4 inch drill bit and remove the center tin plate. Don't remove the teflon (white) insulator. The hardline fits perfect. You will need a spare center pin, or you can drill out the RS pin to size. Please do not use this procedure for anything more than quick fix "meanwhile" repair. These connectors are not the greatest quality.

4)Considering going to VGA for your IBM and adding a scan converter for video out? Compare the cost and what you end up with compared to the new Amiga A1200. The A1200 can be purchased for less than $600.00. It has "ready to go on the air" resolutions up to 800 by 600 lines at a whopping 262,000 colors from a 24 bit palette. You can use your ATV monitor for computer output. It has full screen overscan (no VGA borders) with all resolutions up to 1280 by 400 TTL. The processor is a Motorola 68EC020 at 14 Mhz. This is about the same speed as a 386SX at 20 Mhz. You can add an IDE drive anytime without any extra cards or interface. This is the ATV user dream machine. Imagine a character generator that can do 70 ns video for $600.00!

5)Building a good patch board gets expensive. You can spend upwards to about $300.00 using commercial gear. Well, fear not to make your own! MCM catalog offers male-to-male RCA phono chassis connectors. These connectors may be mounted on a 1 1/2 by 19 inch aluminum rack panel. Simply connect the



"in" and "out" cables from your TV equipment, VCR and camera to the panel on one side. Make up "patch" jumpers for the other side and patch up your best video ever. This eliminates those costly and noisy switch boxes. You will get a better video signal via the patch panel.

Well enough...

Regards and 73

Terry Churchfield K3HKR

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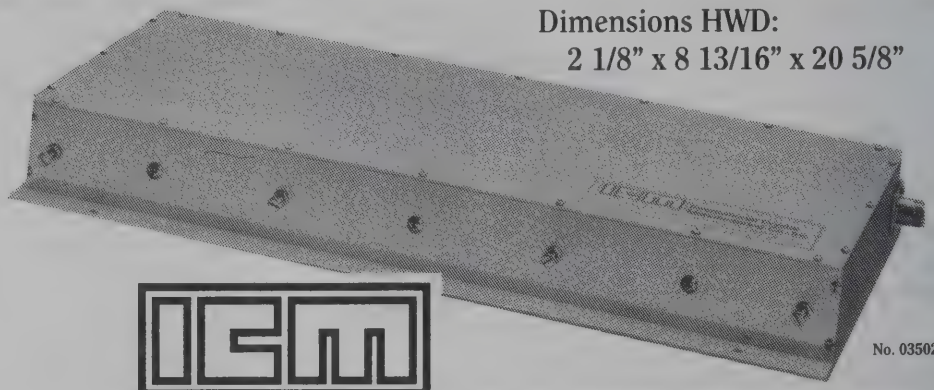

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New Wideband Power Amplifiers

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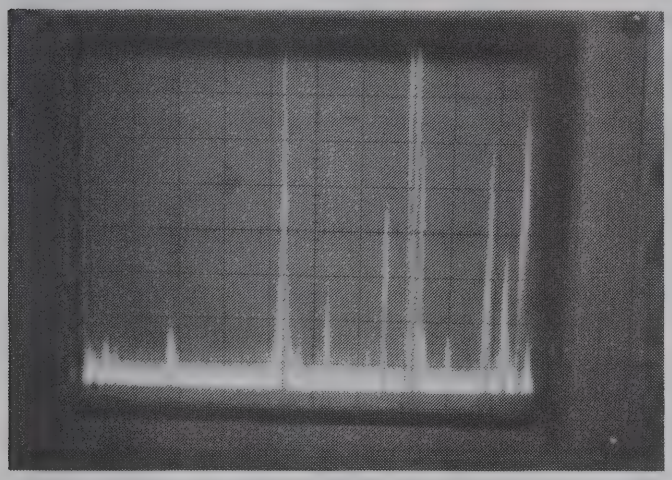
Build Yourself a Spectrum Analyzer

I am not going to give a step-by-step procedure to build a spectrum analyzer. You should, when finished, be able to say "I built it myself", not "I Assembled the kit". Most "How to build whatever" articles assume that you either have a junk box that would do John D. Rockamint proud, or you have all his money to buy all the parts they specify. (One article in a recent issue listed an IC at $129.00). I hope in this treatise to tell you how to use or



adapt what you have or can come by cheap. Another advantage is that when your friend shows you what he built from this same article, it will be different from yours and you can discuss what problems you both had and how you solved them, thereby learning more. And after all, that is one of the reasons for doing things.

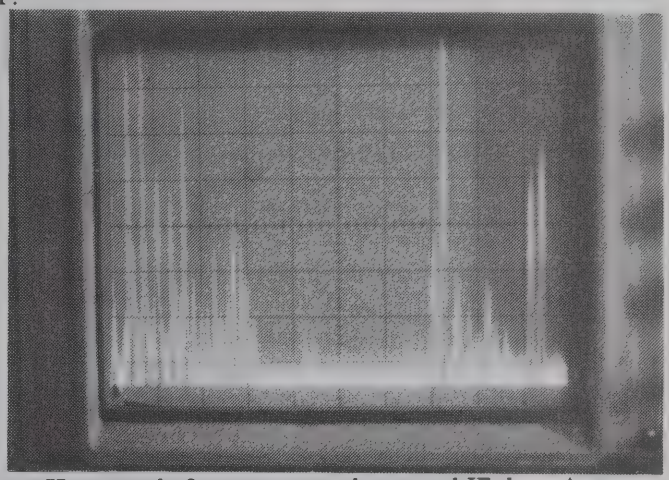
Before I start, I should explain the parts of a spectrum analyzer, or how it works. Basically it is an AM receiver that is tuned across the band of interest and the output displayed on an oscilloscope.

Now let's start with a 'scope. The 'scope used to display the signals on need not be a high priced wide band device. All it has to have is x and y amps of 50 to 100 Khz bandwidth. An old EICO 425 or Heathkit IO-102 or DuMont 304 is fine, but so are any number of others. Now you have made your first decision.

The next decision is dependant on the 'scope you picked. Does the instrument have a good sweep generator or not? You need a couple of volts of good linear sweep, if you can tap the internal sweep generator, fine. If not, you have to build one. A 555 timer makes a usable one but if you prefer another circuit, be my guest (see the IC manual). I will comment now that if you want a really linear sweep using the 555 or other low voltage (12v) device, have the capacitor charge toward 250 or so volts which should be available in any of the older 'scopes. Just connect a 15v Zener across the capacitor so that if it skips a beat the switch circuit doesn't commit Hari Kari. The sweep frequency should be in the ten to 60 hz range.

Next you need the heart of the system - a UHF Varactor Tuner. Which ever one you get, they all have some things in common. They all need Vc, AGC, Vtune, IF out and Ant in. Now on the front panel you want a gain, tune, sweep amp, and antenna in. For the gain, feed a voltage similar to the AGC to the tuner. The tune voltage should cover the same range as the original plus a little extra, so that it covers 420 Mhz to 930 Mhz instead of 470 to 890 Mhz. I recommend a ten turn pot for easier control. A resistor and coupling capacitor will impress the sweep on the tune voltage from the sweep amplitude control. Your choice of coax connector for the RF input completes the front panel.

Next we come to the IF amplifier. The output of the tuner is broadband - 41 to 45 Mhz. This is too wide to use as is, so I suggest converting it to a lower frequency that can be put through a filter to narrow it up. The frequency of the filter will determine the second LO frequency. I found I had some 4.5 Mhz ceramic filters for the sound IF of a TV set so I used a 4. Mhz for a second IF.



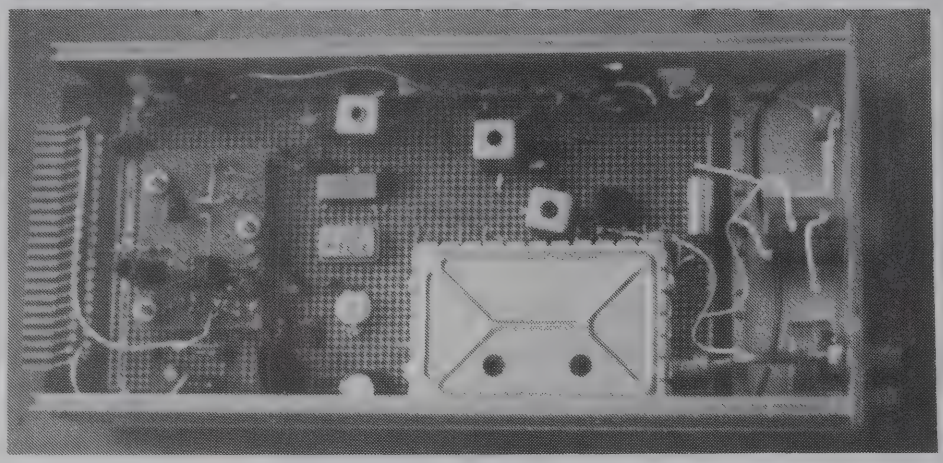
However, before we get to the second IF there Are some considerations for the first IF. I recommend some gain before the second mixer. You want to get as good A signal to noise ratio as possible before the losses and noise of the second mixer. I used a Motorola MC1350 IF IC to give about 60 db of gain at the 41 Mhz but if you have an old IF strip out of a TV or whatever, use it. I used a balanced mixer for the second mixer but only because I had it available, but any mixer circuit usable at these frequencies will work.

Now about the second LO. I used one of those TTL clock oscillators and since they have harmonics up and down the band pick one that the harmonics will fall in a place of little interest. Since I wanted to display TV signals, I picked 48 Mhz the ninth harmonic of which is 432 Mhz. (between the input and output of the local repeater). Those TTL clock oscillators are cheap (around 3 to 4 dollars at hamfests and in catalogs) and are quite accurate and have enough output to nicely drive a mixer.

Now we get to the second IF where the bandwidth is narrowed and the final gain is added before detection. I used a Motorola MC1330 Detector IC after a transistor stage. The transistor matches the input of the ceramic filter to the mixer and the output of the filter drives the 1330. The output of the 1330 is DC coupled to the vert amplifier of the 'scope.

You do not have to use the same second IF that I did. If you have a crystal filter you would prefer to use, do it. Just adjust the

filter for enough bandwidth. The amplitude of the displayed signal should not change if dwell time is increased either by slowing down the sweep or making the filter wider. In fact, the easy way to tell if the filter is wide enough is to slow down the sweep frequency, and if the amplitude increases you need to open up the filter some.

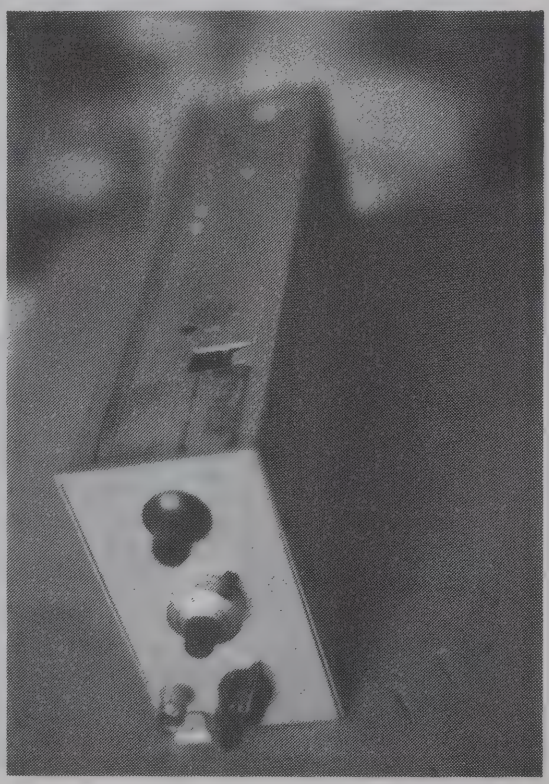


The output of the second detector goes to the vertical deflection of the 'scope. For best results it should be DC coupled. If DC coupling is not possible, DC restore at the deflection plates to that the position does not change every time a strong signal comes on. However, even an AC coupled signal conveys a lot of useful information. You just have to ride the vert. position control.

A 12v power supply should supply the needed power. Pick your favorite, it doesn't have to be elaborate. You can add lower voltage regulators for IC's that require them.

A few comments about how I built mine are in order now. The 'scope I used was an X-Y low bandwidth (one Mhz) large face Tektronix R5103 N with two amplifier plug-in slots with one of them merely blanked off. I found a homemade plug-in at a Hamfest cheap ($3). Stripping out the old guts and replacing the board with a standard blank gave me a plug-in chassis to build on.

You do not have to make it for a specific 'scope. By using a separate power supply and putting the stuff into a cabinet, it can be connected to any 'scope.

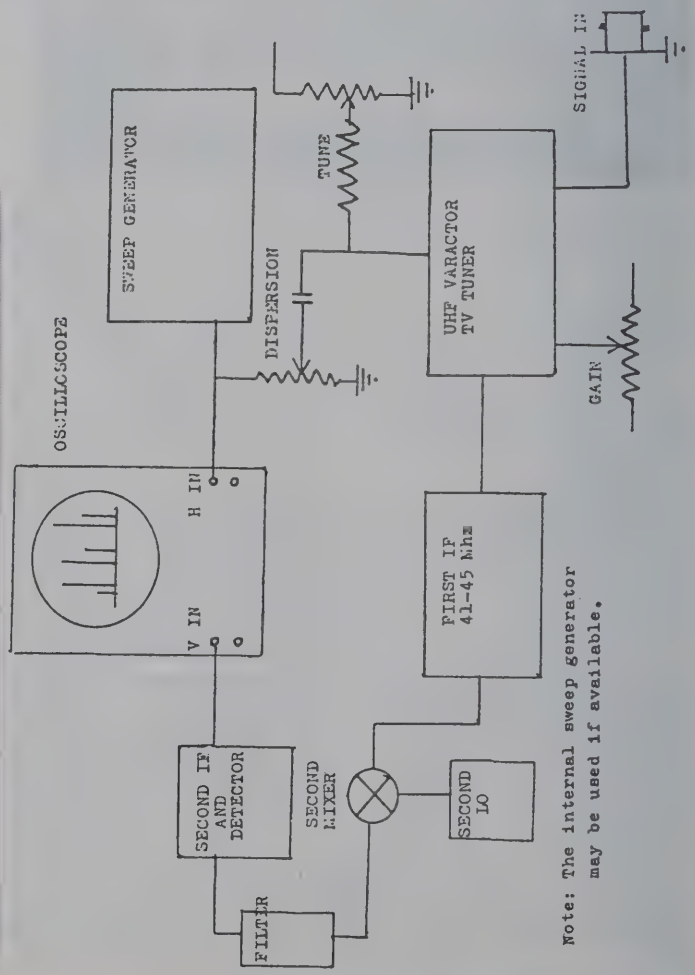


The nice thing about this instrument (other than you built it yourself) is that you can connect it to an antenna and if it should be damaged by lightning or another strong signal, you are not out kilobucks. If you have a good HP or Tek spectrum analyzer you may chance hooking an antenna to it for a short time, but - no way would you keep it connected for long. If a sudden thunderstorm came up and you lost the good one, you would cry. So, even if you have a good one, you may still want to build this one to keep an antenna on to check what is happening on the band.

In conclusion, with a little work you can have a very useful appliance, and you can brag you built it. If you want to display frequencies in the 50 - 225 Mhz range you can use a VHF tuner. Other bands can be covered by making converters to use in front of the instrument. If you make a mixer to convert to other bands, use 50 ohm MMIC's and a wide band mixer so that the gain will be constant across the band. If you bring out an input to the IF, you could use other tuners such as a Gunnplexer for other bands.

In short, this spectrum analyzer can be made versatile, useful, fun and give you bragging rites for having build it.

Have fun. Heru Walmsley W3WVV



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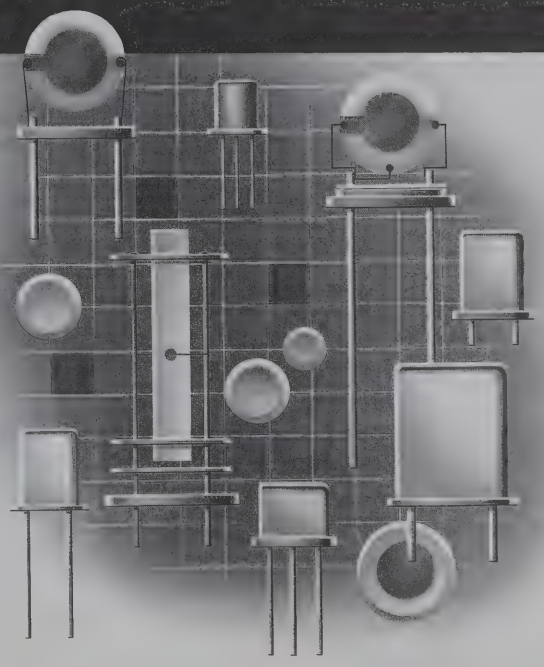

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INSIDE THE TOASTER...

...ONE HOT VIDEO TOY!

How many of you were around long enough ago to be called, or even considered an "appliance operator"? Remember, you were the guy who had no experience, only bucks? You purchased your WAS (Worked All States) and charged your DXCC Award to "mister plastic"! Do you think technology at a user level died during that period? Possibly! Even so there is a new appliance on the Amateur Radio scene, and it is for the ATV dudes!

This new appliance costs a few thousand dollars. A mere pittance when you consider that the "big boys" on 75 meters sit (each night) in front of $5000 dollars worth of appliances and "bitch, belch, boast and beleaguer" at or about their fellow fraternal members. If you are on ATV only to finger a few jesters at your fellow operators, you won't need much equipment at all. On the other hand, if you are serious about graphics, multiple video sources, clean transitions, broadcast quality character generation and studio production this may be for you.

by Terry Churchfield
K3HKR, Pittsburgh, PA

Beyond your transmitter, down converter and antenna system what else is there? Ponder this; we must not care much about the latest camera technology. We still install 10 pin connectors on the front panel of the hottest "state-of-the-art" ATV transceiver. Using BNC connectors for video input would be "heaven forbid" unthinkable. How about Y/C input? Nope! No one would consider, let alone make attempt, delivering more than 270 lines of video anyway. Vestigial Sideband (commercial TV) modulation systems are too expensive. After you amplify VSB exciters with conventional amplifiers, you must filter the signal again. That is just too much money to spend on a hobby. Graphics is yet another story all together. Are you using a Commodore C64? Why not use your expensive "386"? Either operate perfectly running packet. How about a video switcher that will toggle from one video source to another without roll or jitter? I know...you have one of those...a DPDT switch in a metal box! Does time base, black burst or cheap wine mean anything to you? Which one is more important? Do I have to go on? Well, if you are one of those ATV operators who likes cheap wine, read no further. This article is not for you.

IT FITS INSIDE A COMPUTER

This new appliance is a "Toaster" and it ain't just for breakfast anymore.

Most everyone knows about the Commodore Amiga Computer. Several Amateur Operators use the system on slow-scan TV and packet. It is the second most popular computer for amateur use. The Amiga 68xxx systems are hot and out of the box they run video. The first night you put your Amiga on line, you can show it off to your ATV buddies. You may invest as little as $300 or as much as $4500 for the Amiga of your choice. Each Amiga can support genlock (graphics over live video) or chromakey for as little as another $100 investment. There are many paint programs that offer animation and color support up to 4096 colors. Low price peripherals offer 24 bit paint display, animation and frame store for well under $400.

Inside the Toaster

THE TOASTER

The system we are going to talk about is an A2000 base system with the New Tek Video Toaster. A loaded A2000 base system with the New Tek Video Toaster. A loaded A2000 clocks in about the same as a "real" 80386 with Super VGA. The Video Toaster can be purchased for $2100, and put into the Amiga. The Video Toaster offers everything (I mean everything) you will need for a full blown commercial studio system with special effects, 24 bit framestore and paint, 3D animation for virtual reality creation, real 35ns character generator and a four input switcher with ChromaFX, Genlock and Luminance Keying. All this comes with a standard RS170a Commercial broadcast (400 lines) quality output. There is nothing more to purchase. Plug your devices into the Toaster and go. Using a "mouse" you point and click your way through your favorite videos, your cameras and your frame stored images of the band opening last night.

The Toaster is a unique co-process video controller inside the Amiga. It uses the multi-tasking operating system of the Amiga to bring the unit to life. The initial system installation takes about 1 hour. The software is delivered on 14 diskettes with about 2 meg packed of information on each. The system requires 30 meg of hard drive space. That includes CG fonts, framestore, switcher effects, 3D objects and Toaster control. The 24 bit paint utility and ChromaFX programs are in there as well.

INPUT SWITCHER

The switcher is a 4 input live video unit with 3 digital sources of video internal to the Toaster system. There are several "point and click" effects along with conventional flies and wipes for A/B switching routines. The primary Amiga monitor is the switcher control panel. You use the additional monitors for viewing your live video. Keyboard and mouse control aids in operation of these effects. Beside the classic A/B fades and rolls, there are several special effects designed for all the switching applications you could possibly imagine. Over all there are 198 effects built into the Toaster switcher. One such special effect is the silhouette of a baseball pitcher throwing a ball at he screen. The ball gets bigger as it comes toward the screen. As the ball passes through the screen the switcher transforms from A video to B video. The perfect effect for showing those little league clips you have taken.

CHARACTER GENERATOR

The character generator is a full 35ns broadcast quality and resolution. The Toaster internal encoder and keyer produce sharp jaggie free characters in many, many fonts. Even the internal bitmap fonts of the native Amiga look very clean on the air. The high speed character eliminates the common blur or fuzz seen on most generators using keying to add characters to live screen. There are several colors along with shadows, crawl and scroll effects as well. You can use any 24 bit image background, or pass live video through your generated screen. All the CG pages may use the switcher effects for transition and keying. You can use word processors for text screen data storage.

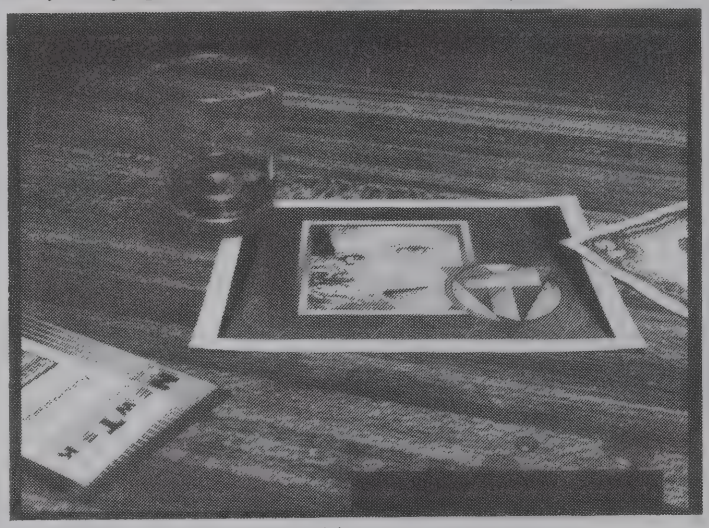
CUSTOM EFFECTS

The video effects are awesome. Toaster uses custom VLSI chips for special realtime processing power. All effects operate in 24 bit color. There are hundreds of special effects including rare effects like "transport", "clouds", "liquid pour" and "windshield wiper". You can have follow black or follow white. There is even a "color bar" wipe that is sensational. The effects include realtime chroma effects (ChromaFX) like the ones seen on MTV and the SCI-FI Channel. You can create negatives, fire, chrome, posterization and solarization. All these effects combine

Inside the Toaster

with the switcher in all modes.

Toaster features include 2, 16.8 million color frame buffers. These buffers meet full broadcast quality frame store. Buffers can be loaded and viewed separately. Simply "freeze" the frame (you may stripe either field from the frame if you desire) you are viewing on the preview monitor. Now use your switcher and send it to your program output. This power allows full broadcast A-B rolls and even A-B-C-D when used with external time base corrected hardware. The Toaster Genlock allows all your graphic buffers to be used for overlay on live video from either frame to any source.



16 MILLION COLOR PAINTING

The Toaster offers the first full 16 million color paint program in broadcast-resolution. This easy to use paint system offers features found in software programs costing 10 times the price of the Toaster. Toaster supports NTSC painting directly. This unique application can import Toaster "framestore" images and composite them with generated character screens using Toasters dual frame buffer system. You can blend, resize, rubthru, lighten, darken and smooth your images from within Toaster Paint. You can import or export images from almost any computer using conversion software (ASDG The Art Department) and clipping them into your own creation using "your imagination" and Toaster Paint.

VIRTUAL REALITY

The Toaster comes with a 3D rendering program called LightWave. This program offers reality to any Toaster user. Many special images and animations can be created using LightWave. Those flying logo animation effects you see on network TV are done using the same technique offered in LightWave. The program uses basic objects that you create, or those you purchase, and allows you to animate them. You actually set the stage. Place the camera and adjust the lights for each frame. Turn a cow from reality to wood, then back to chrome or gold if you wish, all while you fly your camera around the subject. Turn trees into fog, or fog into water. Fly your calls around your tower. Genlock your animations over live video. Create an entire reality animation supporting your clubs next balloon launch. Tie the animation in with live scenes from the recorded launch video.

Because the Toaster can send single frame control commands to frame controllers via third party software, you can control single frame animation on many of the commercial VCR's available today. There are some less expensive controllers for consumer products you can use as well.

With the many active amateur radio operators turning to ATV for an even greater challenge in our hobby; the Toaster seems like the perfect applliance for real, honest quality video. If you consider the secondary markets you can reach out to, like local sports, education, weddings, anniversary videos and cable access. The Toaster can be your best hobby toy, and your second income maker as well. For the first time you "can" make money from your favorite hobby. The Toaster makes "toast" in a whole new way!

If you are interested, the manufacturer will send you a free video tape demonstrating the Toaster. Maybe this is just the beginning for some real ATV video. Isn't it about time we became more than amateur...

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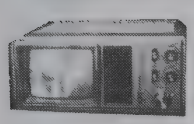
  Stands up under rough public service applications and takes up less space on the operating table than 1 Watt plus amp.
- True Final RF detected video monitor output
  lets you properly set the video gain control based on final output RF rather than low level. Camera video is at this jack during receive for focus & lighting set up before transmitting.

Front panel jacks accept composite video and line audio from your camcorder or VCR plus a low Z mic with push to look. Sensitive GaAsfet downconverter tunes whole 420-450 MHz 70cm band down to your TV channel 2, 3 or 4. Comes with one crystal you specify on 439.25, 434.0, 427.25 or 426.25. Second switch selectable crystal add $15. Requires 13.8 Vdc @ 3 Amps.

P.C. Electronic pioneered the ATV transceiver in 1977 with the 10 Watt TC-1. While the change in 1985 to the 1.5 Watt units gives the flexibility of selecting 15, 50 or 70 Watts depending on the situation, many long time ATVers said they missed the old 10 Watter which did just fine in most cases for local and repeater use - *90 miles snow free line of sight using 14 dBd beams. You've always been able to build your own 10 Watt system from some of the basic modules on page 2 (TVC-2G, TXA5-70, FMA5-F and PA5), but now we have a ready to go alternative in a rugged die cast aluminum box.

Transmitting equipment sold only to licensed Tech class radio amateurs, verified in the Callbook, for legal purposes. If newly licensed or upgraded, mail or fax copy of license. However, receiving downconverters available to all (pgs 4 and 5).

COMPLETE 70CM ATV STATION



Your TV set

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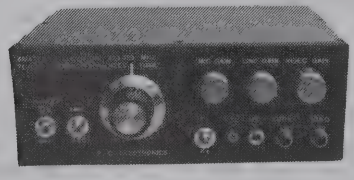

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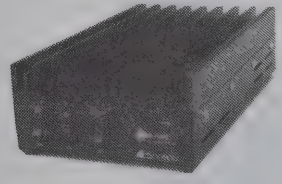

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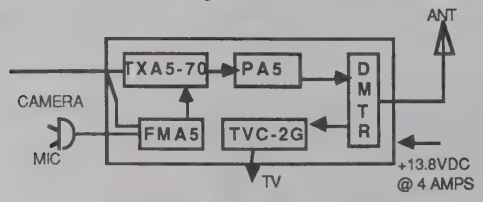
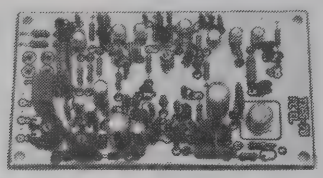
BUILD YOUR OWN 10 WATT ATV STATION

Basic 10 Watt system - 3 Transmitting modules as seen in the Handbook

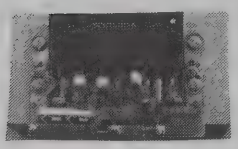


See chapters 20 & 7 in the *ARRL Handbook*. These modules are the latest upgraded generations. Mount the boards & parts for a 10 to 15 Watt basic module ATV transceiver in a 3x8x12" aluminum chassis for shielding and heat sinking. Use the DMTR module to switch 50Ω 70cm antenna between PA5 amp & downconverter. See the TVC-2G Downconverter module on page 5. Schematic & layout comes with each module.



TXA5-70 4.0"X2.25"

TXA5-70 ATV EXCITER/MODULATOR.....$89
Replaces TXA5-5. Smaller board for stand alone portable or R/C applications in addition to 10 Watt systems. Wired and tested board. 50-80 mW output to drive the PA5 10 Watt power amp. Accepts standard 1 volt composite video from color camera, VCR, computer, etc. Wideband modulator gives excellent color and high resolution. Built-in sync stretcher. Draws 70 mA at 13.8 Vdc. One crystal included, but provision for 2. **Extra crystal $15.**
We stock 439.25, 434.0, 427.25 & 426.25 MHz, other 70 cm freq. may take 4 weeks to special order xtal. 100 Ohm carbon panel pot for video gain **$5.**



PA5 3.5"X2.0"

PA5 10 WATT P.E.P. ATV POWER MODULE.....$89
An all mode Toshiba S-AU4 is mounted on a heatsink with a stripline PC board to output over 10 Watts p.e.p. when driven by 80 mW from the TXA5-70. 50 Ohms in & out. Broadband, 420-450 MHz, linear, no tuning. 250 mW max RF input, do not use with 1 Watt modules. req. 13.8Vdc reg. @ 3 amps.

FMA5-F 3"X1.5"

FMA5-F AUDIO SUBCARRIER GENERATOR.....$39
Temperature stablized VCO with adjustable deviation to more than 25 kHz. Transmits broadcast standard sound with your picture. Accepts a Low Z mic (100-600 Ohms), also line level audio from VCRs, camera mics, computers, etc. Up to 1 v pk-pk drive to the TXA5-70, TXA5-RC or TXA5-33 exciter modulators. Works with any transmitter having 5 MHz modulation bandwidth. Draws 20 ma from 13.8 Vdc supply.

TR-10

DMTR T/R RELAY, DETECTOR & MONITOR.....$35
T/R switching for up to 15 Watt 70cm ATV systems. Negligible insertion loss, 60dB isolation. Mounts on flange type UG58 N chassis jack ($2). Peak detector relative RF meter output. 3.5x2". 13.8Vdc @ 80 ma.

TR-10 70cm or TR-23 - 23 & 33cm T/R RELAY.....$29
Same as DMTR without monitor output and peak detector. Has RF test point.

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D1010-ATVN MIRAGE 100 WATT P.E.P. AMP.....$349
420-450 MHz all mode: FM, SSB,CW, & ATV. Special ATV version for good color and sound from the 10 Watt basic modules. Sync power (p.e.p.) >100 Watts with blanking set for 60-70 Watts from TC70-10, TXA5-70 + PA5 (6-7 Watt sync, 2-3 Watt blanking set up), over 50 Watts sync from TC70-1 or KPA5. ATV duty cycle 10 min on /5 off, other modes 5 on/5 off. RF sense T/R switching. 12x3x5.5". Req. 13.8 Vdc @ 20A. 15 Watts drive limitation.

D1010ATV-R or D100ATV-R

D1010ATV-R MIRAGE 70CM REPEATER AMP.....$519
Continuous duty version of D1010N. Made to match TXA5-70/PA5 10 Watt modules. Rugged large heat sink for repeater or long key down time. 100 Watts p.e.p. or 80 Watts CW. 8.75" H 19" rack panel. T/R switch add $25.
D100ATV-R repeater version gets 90 Watts p.e.p. for 1.5 Watts drive from RTX-70 or KPA5. 7 Watts drive limitation.

D100ATVN MIRAGE 1.5 in/>70 WATT OUT AMP.....$349
Designed to match our TC70-1d, TXA5-RC and KPA5 1.5 Watt transmitters. 7 Watt maximum drive, cannot be used with the 10 Watt modules. All other specs the same as the D1010N.

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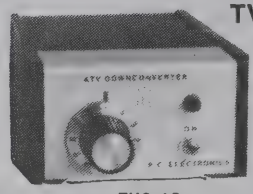
420-450 MHz ATV DOWNCONVERTERS

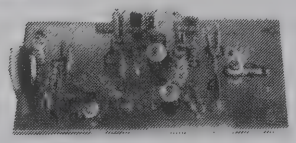
GET STARTED WITH ONE OF THESE TO *SEE* THE ACTION!

Space Shuttle video



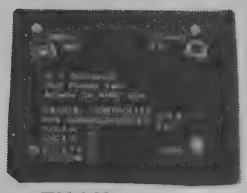
TVC-4G

TVC-4G PACKAGED DOWNCONV. with AC supply.....**$89**
Contains the sensitive TVC-2G board in a shielded 4x2.5x7 cabinet ready to go with 120 Vdc 60 Hz to 12Vdc wall plug power supply. BNC antenna input and F output to TV. Companion downconverter to our transmitter boards. BNC male to N female adaptor for mating with larger coax $5. TVC-4G is handy for ATV portable, mobile, demos, or getting a friend on. Also used in community pay TV systems outside USA.



TVC-2G 2"x4"

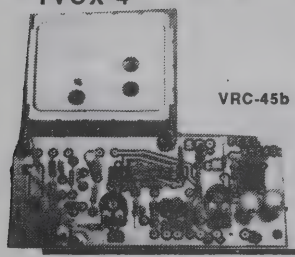
TVC-2G GaAsFET TUNEABLE DOWNCONV. BOARD.....$49
Wired and tested module connects between 70cm antenna and TV set tuned to channel 2, 3, or 4. Varicap tunes whole 420-450 MHz 70CM amateur band. Sensitive 1 dB NF dual gate GaAsfet used in both the preamp and mixer stages. Double tuned bandpass filter rejects strong UHF broadcast interference. 25 dB gain. Requires +11 to 18 Vdc @25 mA , shielded enclosure, knob, 10K pot, switch, fuse and connectors.



TVCX-4

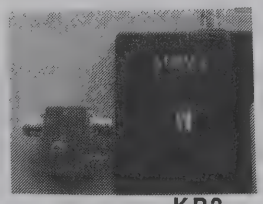
TVCX-70 3"x3.8"

TVCX-70 XTAL CONTROLLED GaAsFET DOWNCONV....$99
Crystal controlled version of tuneable TVC-2G board used in repeaters or unattended operation with wide temperature variations or at a public service event where a tuning knob might be touched by unauthorized persons. Specify input frequency (421 to 440 MHz) and output (ch 3 or IF). +11 to 18 Vdc @ 50 mA external power, shielded enclosure and connectors required. 2 freq. add **$15.** LMB CAB-234 box...**$13**
TVCX-4 is the TVCX-70 board ready to go in the CAB-234 box ...**$129**



VRC-45b

VRC-45b 45.75 MHz IF/receiver module. 2 composite video outputs, squelched line & speaker audio outputs. Used with TVCX-70 in a CAB -247 box for complete receiver. 4x3.75". 12V @ .25A.....**$99**



KP2

MIRAGE KP2 ANTENNA MOUNTED PREAMP.....$159
If your coax loss is greater than 3 dB then this preamp can make a difference. Automatic T/R switching 1/4 to 150 Watts. .6 dB NF 15 to 25 dB gain. N conn. requires 12 to 14 Vdc to incl. dc coupler in shack.

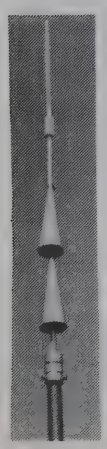
KLM & RUTLAND BROADBAND BEAM ANTENNAS FOR ATV

KLM 440-6X 8.9 dBd gain, 28" boom, vertical or horizontal polarization rear mount. Ideal for point to point, fixed at a repeater or small enough to be portable at public service events to minimize multipath ghosts and get some gain at the same time. Wide 60 degree beam width. All 3 include 50 Ohm balun with Type N female conn.**$60 del.**

KLM 440-10X 11.2 dBd gain, 64" boom. Bigger version of the 6X....**$72 delivered**

KLM 440-16X 14.2 dBd gain, 10.5 ft boom, center mounted. full 420-450 MHz bandwidth, and very rugged .....**$129 delivered**

RUTLAND FO22-ATV 15.8 dBd, 420-450 MHz, 14 ft boom, center mtg...**$105 del.**



The antenna, coax and tower height are the most important part of your ATV system and deserves your most care and attention. ATV antennas must have broad bandwidth in addition to high gain and low VSWR. Few other antennas work well at both 439 and 421 MHz. The three KLM and one Rutland antennas listed here fit the requirement and have a long history of rugged operation with ATVers. The gains listed have been proven out at VHF/UHF conference antenna measuring contests, they are not marketing hype. All four beam antennas listed here take up to the maximum legal power limit. Balun or matching network with female type N connector is included. We suggest using Belden 9913 (2.6 dB/100') or better 50 Ohm low loss coax or hard line. Belden 8214 (4.2 dB/100') is more flexible and is fine for runs less than 50 feet.

AEA 450 ISOPOLE OMNI 4 dBd GAIN ANTENNA. 50 ohm type N female feedpoint. DC grounded.**$89**
High efficiency decoupling cones puts all the RF on the horizon where it counts. Mounts on 1 1/4" dia masts. Great for local ATV or FM simplex round tables, R/C, portable/ public service/ Kreepie Peepie system, & repeaters.

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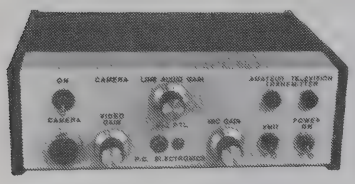
TOM (W6ORG) & MARYANN (WB6YSS) O'HARA (818)447-4565
24 hr **FAX** order line (818) 447-0489

ELECTRONICS

NOW YOU CAN GO FULL DUPLEX ATV WITH OUR 900 AND 1200 MHZ GEAR

Did you know you can run full duplex or repeat with your 70 CM ATV system by simply adding a 33 or 23 CM system? Receive and transmit at the same time, crossband, without filters. You can get enough isolation usually with 10 ft antenna separation. How about a remote link to your base 70 CM station? Link weather radar or Space Shuttle NASA select satellite video to your local ATV repeater - there is a whole new world of personal & public service applications possible.



TX33 or TX23

1 WATT TV TRANSMITTERS for 33 & 23CM...$329

TX-33 for the 902-928 MHz band and **TX-23** for the 1240-1300 MHz band. Specify frequency: 910.25 simplex or repeater input, 1289.25 simplex, 1277.25 repeater input are most common, others available. Greater than 1 watt p.e.p. (sync tip) with adjustable blanking pedestal for proper setup with DownEast Microwave linear amplifiers. Call them at (207) 948-3741. Built in T/R relay with BNC output to same band TVC- xG downconverter. Independent controls for mic and line audio. Push to look. 10 pin VHS camera connector plus video & audio input RCA phono jacks on back for any other camera, camcorder,VCR or computer video switch selected from the front panel. Video monitor output has actual detected modulation in transmit for accurate adjustment of video gain, & camera video in receive. Req. 13.8 Vdc @ .5A. + camera current. 7x7x2.5" shielded cabinet, 1 lb 10 oz.

TXA5-33

RTX-33 & **RTX23** versions in a diecast aluminum box without T/R relay are also available intended for those putting up a dedicated repeater or link system (see pg 6).....**$329**

TXA5-33 1 WATT ATV TRANSMITTER BOARD.....$139
This wired and tested 33 CM (902-928) board is for those who want to package their own system. Req. FMA5-F ($39)for sound subcarrier &13.8 Vdc @ 500 mA. 3"x5". **TR-10** module gives low loss T/R antenna switching between TXA5-33 & TVC-9.**$29**

TVG-12A

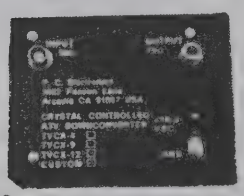
TVG-12A 1240-1300 MHZ FM & AM 50MW ATV TEST GENERATOR....$25
Simple modulated oscillator board for testing receivers, antennas, short links etc.

TVC-9G
TVC-12G

DOWNCONVERTERS FOR 33 & 23 CM:

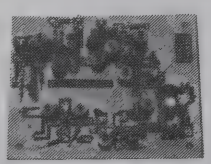
TUNEABLE READY TO GO in 4x2.5x7 shielded cabinet with 120 Vac to 12Vdc wall plug power supply. All our downconverters have GaAsfet preamp and mixer. If your Belden 9913 coax is longer than 50 ft., you might consider adding the DownEast Microwave antenna mounted preamp (call them at 207-9483741). We have the model **APA** coax power supply to power them from the shack for $25.

TVC-9G tunes whole 33 CM 902-928 MHz band down to ch 2, 3, or 4.....**$99**
TVC-12G tunes whole 23 CM 1240-1300 MHz band down to ch 7 or 8.....**$109**



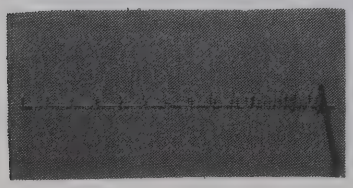
TVCX-9
TVCX-12

CRYSTAL CONTROLLED in dicast aluminum box, requires external 11 to 15 Vdc.
TVCX-9 specify input 33 CM frequency and output on CH 3 or 45 MHz IF....**$139**
TVCX-12 specify input 23 CM frequency and output on CH 10 or 45 MHz IF...**$159**



TVCX-33
TVCX-23

WIRED AND TESTED BOARDS for those who package their own systems.
TVC-9 varicap tunes 902-928 MHz to open channel 2, 3, or 4 in your area **$59**
TVCX-33 crystal controlled specify 33 CM input and CH 3 or IF output freq.....**$109**
TVCX-23 crystal controlled specify 23CM input and CH 10 or IF output freq.....**$129**
VRC-45b 45.75 MHz IF/receiver. 2 video outputs, squelched audio.....**$99**



ANTENNAS

DOWNEAST 3318LYARM 33CM YAGI ANTENNA 18 ELEMENT 14.2 dBd.**$82**
Specially optimized for ATV on 910-923 MHz. 6 ft boom, 50-ohm type N female conn.

DOWNEAST 2424LYRM 23CM YAGI ANTENNA 24 ELEMENT 16.2 dBd....**$82**
Specially optimized for ATV on 1241-1289 MHz. 6 ft boom, 50-ohm N female conn.

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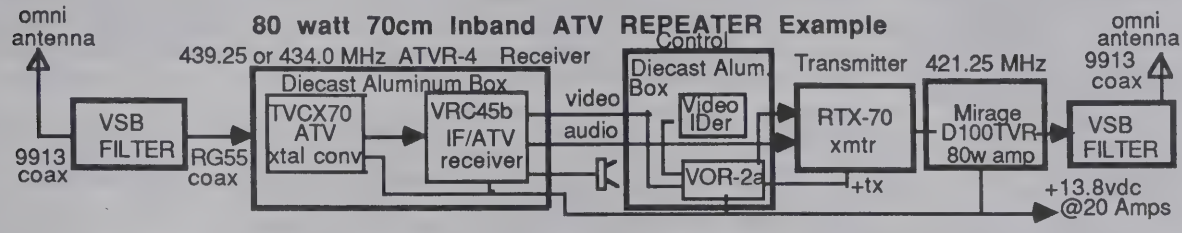
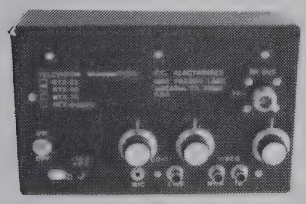
24 hr **FAX** order line **(818) 447-0489**

READY FOR AN ATV REPEATER OR LINK IN YOUR AREA?
WE HAVE THE MODULES AND SOURCES FOR INBAND OR CROSSBAND

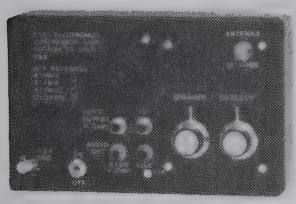


Select an RTX Transmitter and a ATVR Receiver for the bands you want, add the appropriate linear amp,VSB filters & antennas, ID & VOR-2a, power supply and coax for your own repeater. We suggest low in / high out for crossband. Ask for a copy of our ATV Repeater article before you start so you will do it right the first time. Also listed are recommended sources of filters, antennas, IDers, etc. Most can put together a good working ATV repeater for under $2000.



TRANSMITTERS ready to go in a 7.3x4.7x2 die cast aluminum box for tight RF shielding. >1 Watt p.e.p. output for proper drive to companion amplifiers. Adjustable sync stretcher to enable set up of the right video to sync ratio after an amplifier is added. Independent mic and line audio inputs. Requires 13.8 Vdc at 500 ma.

RTX-70 specify output frequency, 421.25 MHz most popular rptr. output **$279**
MIRAGE D100ATV-R 90 Watts p.e.p on ATV continuous duty 70cm repeater amplifier see page 2 for more info and picture **$519**
RTX-33 specify frequency - 923.25 MHz most used frequency **$329**
RTX-23 specify frequency - 1253.25 MHz best first repeater output frequency....**$329**
We suggest Downeast Microwave for 900 MHz (3318PA) and 1200 MHz (2318PAM or 2335PAM) repeater amps to match our transmitters. Call them at (207) 948-3741.



RECEIVERS ready to go in a 7.3x4.7x2 die cast aluminum box for tight RF shielding. Contains a TVCX crystal downconverter and VRC-45b receiver. Two composite video outputs, squelched speaker and line audio outputs. Requires 13.8 Vdc at 300 ma.

ATVR-4 specify frequency - 439.25 or 434.0 most popular for inband or crossband repeater input.....**$299**
ATVR-9 specify frequency - 910.25 most popular repeater input.....**$309**
ATVR-12 specify frequency - 1253.25 link, 1277.25 repeater input.....**$329**

VOR-2a Video Operated Relay board...$45, keys RTX upon detection of horizontal sync plus 10 min. & end of transmission momentary relay for switching to video ID to meet FCC regs. Now with pots for input sensitivity, tx hang time and 10 min. ID time. Noise imunity improved. See review in July 91 73 Magazine page 26.

LMB CAB 247 7.3x4.7x2 die cast aluminum box. Great for housing VOR-2a and video ID boards...**$20**

ANTENNAS When comparing prices remember ours include delivery by UPS surface in contiguous USA.

F718 Diamond vertical omni 9.3 dBd gain, 15 ft long. Specify 70cm video carrier frequency.....**$219**
440-6X KLM 8.9 dBd gain 420-450 MHz 6 element beam. 28" boom, end mounted.....**$60**
440-10X KLM 11.2 dBd gain 420-450 MHz 10 element beam 64 " boom, end mounted.....**$72**
440-16X KLM 14.2 dBd gain 420-450 MHz 16 element beam 10.5 ft boom, center mounted.....**$129**
FO22-ATV RUTLAND 15.8 dBd gain 420-450 MHz 22 element beam 14 ft boom, center mtg.....**$105**

FP-19 Comet vertical omni 10 dBd gain, 7 ft 4 in long. Covers 902-928 MHz.....**$109**
3318LYARM Downeast Microwave 14.2 dBd gain 902-928 MHz beam. 6 ft boom, end mounted....**$82**

F1230 Diamond vertical omni 11.3 dBd gain, 10.5 ft long **$159**
2424LYRM Downeast Microwave 16.2 dBd gain 1240-1300 MHz beam. 6 ft boom, end mounted..**$82**

DOWNCONVERTER DISCOUNT of 10% is available to Repeater groups and clubs if you order 5 or more per item of the tuneable downconverters on pages 4 or 5. Special discounts for Teacher Hams - call. The order must be sold and shipped to one person at one time. It helps to have some extras available for new people to try out your repeater or use at demos at other clubs and schools. All downconverters have a GaAsfet preamp and mixer for low noise and high dynamic range. Get a board if you want to package your own - you will need a shielded cabinet with knob, switch, connectors and 11 to 14 Vdc power supply. Or get one ready to go.

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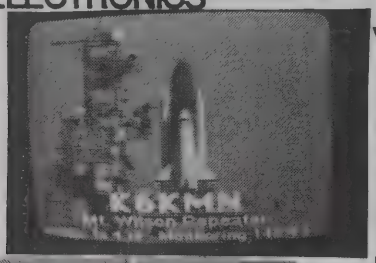
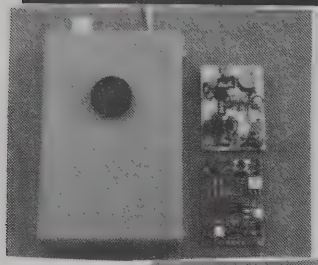


VIDEO IDer HIGH TECHNOLOGY FLIGHT GVID $175

This small .8 x 3.15" board can overlay your call, location and any other information in white letters on any clean video source such as from a camera, VCR, TVRO or weather radar. This is not for repeater video with less than P4 signals. The information is held in a PROM, so no loss when power fails. Ideal for putting in the video line from NASA Select or weather radar to meet the legal requirement and still not interrupt with a full screen video id source just when the best picture comes on. Or it can relieve you of remembering to ID at the home station or at public service events. There is an automatic 5 to 10 minute timer that turns it on for 10 seconds or it can be set to run continuous. Also has three switch and one analog telemetry input. Req. 5 Vdc @ 120 ma. Small enough to be put inside most chassis or its own 1590B die cast aluminum box & connect between video jack and transmitter board.



MICROTEK ATVM-70 mini ATV transmitter board.....$129

Only 1.0 x 1.3 inch, wired and tested board. See article in July 91 73 Magazine page 9. Nominal output 80 mw. Capable of driving the PA5 for higher power. Requires 7.0 to 10.0 Vdc maximum at <100 ma. Only 434.0 MHz is available with the SAW oscillator. Also Great for R/C models, robots, demos or short links. Snow free line of sight DX1/4 mile dipole to dipole or up to 5 miles with KLM 440-16x's .

NEW companion **MSC-2** 4.5 MHz sound subcarrier board, same board size as xmtr..**$59**

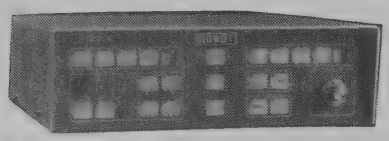
MICRO VIDEO PRODUCTS Series 1 MINITURE B & W CAMERA.....$229

Just the thing to go with the small ATV transmitter boards for R/C, balloons, handie-lookies, etc. Small, only 3 1/8 x 2 x 7/8. Light, 4 oz. in a rugged sheet metal case. Accepts +7 to 15 Vdc at 85 ma - can run on a 9V battery. 1/3" MOS pickup device gives 240 line horizontal resolution with 80,000 pixels. 2 lux minimum illumination. Has 4.5 mm F1.8 lens that focuses down to 6". 1 V video output .

DIAMOND SX-1000 RF POWER METER.....$225

This power / VSWR meter covers just about all you will ever need in one box. No need for an expensive meter plus slugs for each band and power level. The SX-1000 covers 1.8 to 1300 MHz with switch selectable full scale ranges of 5, 20 and 200 Watts. Type N connectors above 400 MHz and SO239 below. Check your antenna VSWR as well as accurately set the blanking pedestal whether barefoot at 1.5 Watt or thru a 100 Watt amp.

COLOR SSTV WITH THE ROBOT RESEARCH 1200C.....$1295 delivered



Still the standard for slow scan television around the world. Send and receive efficient 8 sec. Black and White or 12 sec. color with your HF SSB transceiver for DX pictures, VHF/UHF FM for local, or repeat SSTV DX over local ATV. 6 picture memories, 4 transmission formats - 120 & 240 lines, accepts any composite video or use internal color bars, 262,144 color combinations, parallel I/O printer port, outputs to composite video or RGB monitor or ch 2/3, and many other features.

WE ARE ROBOT'S ONLY REP/DEALER FOR AMATEUR SSTV

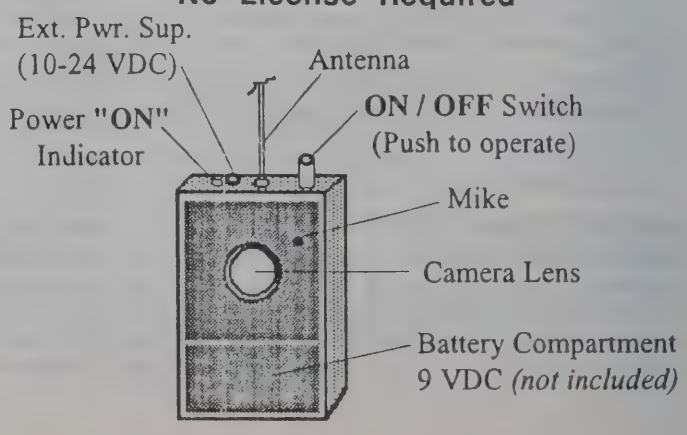
NOW YOU CAN SEE THESE DEALERS FOR THE TC70-10 AND TUNEABLE DOWNCONVERTERS:

A-Tech	Bill	2210 Magnolia Blvd	Burbank	CA	91506	(818) 845-9203
Jun's	Raul	5563 Sepulveda Bl.	Culver City	CA	90230	(310) 390-8003
Henry Radio	Paul	2050 S. Bundy Dr	Los Angeles	CA	90025	(800) 877-7979
The Base Station	Art	1839 East ST.	Concord	CA	94520	(415) 685-7388
Rick's Communications	Rick	1726 M St.	Merced	CA	95340	(209) 723-1269
Lentini Communications	Alex	21 Garfield St	Newington	CT	06111	(800) 666-0908
IRC	Juan	5001 NW 72nd Av	Miami	FL	33166	(305) 594-4313
Honolulu Electronics	Richard	819 Keeaumoku St	Honolulu	HI	96814	(808) 949-5564
Stewart Electronics	Dale	1411-C 1st Capital Dr.	St. Charles	MO	63303	(314) 949-8890
Oklahoma Comm Center	Glen	3900 S. Broadway, Suite 6	Edmond	OK	73013	(800) 765-4267

Microtek PIXSEE Handie Lookie $669

Use for wireless home security monitoring, etc. Great for wireless video and audio - repeat through your ATV transmitter in the shack or public service events. Transmits Black and White video and audio with its built-in mini camera and mic on 915 MHz up to 150 ft line of sight, or as far as 700 ft with the 3318LYRM antenna at the receive end. Type accepted transmitter under FCC Part 15 legal for anyone to use. Hams can use the TVC-9G Downconverter and TV to receive or ATVM-9 and monitor which are more sensitive than the Radio Shack and other wireless TV downconverters presently on the market. Runs on internal 9V battery or external 10 to 14 Vdc @ 200 mA. Size 4.5 x 2.7 x .9 inches. Minilink model without the built-in camera to enable connecting to your camcorder audio and video outputs for color transmission is **$365**

No License Required



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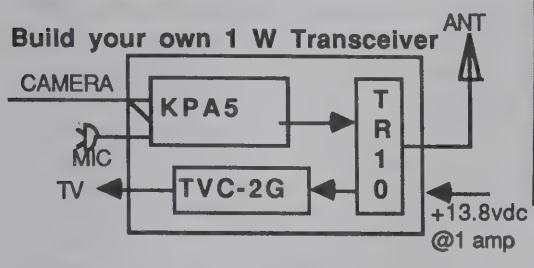
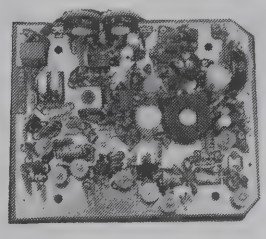
THE "KREEPIE PEEPIE" ATV TRANSMITTER

THIS IS THE ATV TRANSMITTER BOARD YOU HAVE READ ABOUT THAT HAS SURVIVED MANY BALLOON FLIGHTS TO OVER *100,000 FEET* AND BACK. ALSO USED FOR R/C MODELS WHERE AN ALL IN ONE BOARD WITH SOUND IS DESIRED OR DEDICATED LINKS AND REPEATERS. JUST THE THING FOR THE BUILDER WHO WANTS TO PACKAGE AND MAKE HIS OWN PORTABLE 70 CM ATV TRANSMITTER OR HOME TRANSCEIVER WITH A WIRED AND TESTED BOARD.





KPA5-F board only $169

KPA5-E 70CM ATV XMTR BOARD FEATURES:

- 1.5 Watts P.E.P. typical RF output. Run barefoot for portable, but if needed for greatert DX, the output properly matches the Mirage D15N 15 watt, D26N-ATV 50 Watt linear amp for full output or D100TVN to over 70 Watts with its adjustable sync stretcher.
- FULL COLOR AND SOUND on a small 3.25x4" board
- Wired and tested board runs on external 13.8 Vdc @ 300 mA. supply or 12 V battery. Weighs only 3 oz.
- Accepts composite video from cameras, camcorders, VCRs, computers, etc. 2 audio inputs, one for low Z dynamic mic, & one line level from most cameras & VCRs. Transmit monitor output enables seeing your own true RF detected video.

KPA5 APPLICATION:

PORTABLE CORDLESS TV CAMERA. Think of it as a video HT. Place the KPA5 in one of the L.M.B. Diecast aluminum boxes, AEA HR-4 half wave "hot rod" on top or at the end of 50Ω coax attached to a headset. Plug into a 12-14 v source such as a 12 Vdc battery pack. Depending on terrain & receiving antenna DX is typically over 1 mile. With KLM 440-16Xs at both ends DX is 22 miles snow-free line-of-sight.

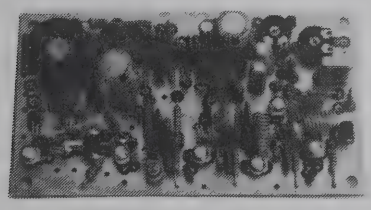
Price only $169 supplied with one xtal on 426.25, 434.0, 427.25 or 439.25. 2nd xtal add $15. Specify frequency(s) when ordering, check with local ATVers, ARRL Repeater Directory or call us. Sold only to Technician class (including new code free Tech) or higher licensed radio amateurs.

ACCESSORIES:

L.M.B. CAB247 7.3x4.7x2" roomy aluminum box.....**$20**
CAB234 4.6x3.6x2" aluminum box, smaller tighter fit.....**$13**
100 Ohm panel pot for video gain control.....**$5**
TR-10 RF T/R relay module, mounts on chassis N conn.....**$29**
TVC-4G..$89 or TVC-2G..$49 Downconverter (pg 5)
VOR-2a Video (horiz sync) operated relay board.....**$45**
MIRAGE D15N-ATV 1.5 in /15 out all mode amp.....**$169**
MIRAGE D26N-ATV 1.5 in / 50 out all mode amp.....**$239**
MIRAGE D100TVN 1.5 in/70 out all mode amp.....**$349**

AEA HR-4 "Hot Rod" half-wave portable antenna.....**$24**
450 ISOPOLE omni 4 dBd vert. gain antenna.....**$89**
KLM 440-6X 8.9 dBd ant., 28" boom, >50 deg. BW.....**$60**
KLM 440-10X 11.2 dBd, antenna, 64" boom.....**$72**
KLM 440-16X 14 dBd antenna, 10.5 ft boom.....**$129**
UG21 type N male connector for Belden 9913 coax.....**$5**
UG58 N female flange type chassis connector.....**$2**
800J 10 pin VHS color camera chassis connector.....**$10**
800P 10 pin VHS color camera cable male plug.....**$15**

SMALL TXA5-RC 1 WATT ATV TRANSMITTER.....$129



TXA5-RC

Designed primarily for Radio Control models, rockets, balloons, etc. with it's small 2.25 x 4 inch size and 2 oz. weight. Adjustable power output from 1.5 p.e.p. to 100 mW. Draws 350 MA @ 13.8 Vdc and 1 Watt, 200 ma at .100 mw Has adjustable sync stretcher and provisions for sound from the FMA5-F board (pg 2) in case your application needs higher power sometimes or subcarrier sound. Comes wired and tested ready for you to mount in a shielded enclosure, connect up coax from antenna and camera and wires to power source. Plan on shielding your R/C receiver and adding the simple antenna low pass filter supplied with the application note. Receive with one of our 70 cm downconverters listed on page 5 and a TV set Specify freq., 426.25 MHz suggested for R/C, other standard ATV freq. avail.

See page 8 & 10 for mini cameras

New TXA5-70a board can also be used for R/C applications where 2 frequency capability is desired. Same size as TXA5-RC but 80 mw.for .25 to 5 mile DX, or add 10 Watt PA5 amp for 3 to over 100 mile line of sight DX. See pg 2.....**$89**

ATVM-70 Tranemitter MSC-2 Sound

NEW MICROTEK ATVM-70 mini ATV transmitter board.....$129
Only 1.0 x 1.3 inch, wired and tested board. See article in July 91 73 Magazine page 9. Nominal output 80 mw. Capable of driving the PA5 for higher power. Requires 7.0 to 10.0 Vdc maximum at <100 ma. Only 434.0 MHz is available with the SAW oscillator. Also Great for R/C models, robots, demos or short links. Snow free line of sight DX1/4 mile dipole to dipole or up to 5 miles with KLM 440-16x's .
NEW companion **MSC-2** 4.5 MHz sound subcarrier board, same board size as xmtr....**$59**

RF POWER MEASUREMENT

Doug Lung W3DL

edited from a column in TV Technology

When **TV Technology** asked me to do a monthly column on RF, I wondered how I would generate enough words every month to fill a column. To make it more difficult, they wanted the words to be interesting. I decided to give it a try. I will attempt to provide items of interest to engineers working with TV transmitters, microwaves and satellites.

As a ham (W3DL) I've always enjoyed Bill Orr's columns in "Ham Radio" and now "CQ". I hope he won't mind if I borrow a bit of his style for this column. Turn to this page to read news and rumors about the TV RF business, nifty circuits, handy hints and technical discussions of topics such as antennas, transmitter maintenance, new technologies and computer programs for the RF engineer.

My two-part article earlier this year on calorimetric power measurements generated a large, gratifying response from **TV Technology** readers. Both EEV and I have been distributing copies of a computer program to do the calculation (it's free), and I see a number of you have downloaded the version on CompuServe's Broadcast Professional's Forum (BPForum).

The most requested new feature was a way to measure power at sync levels other than 40 IRE units (75 percent blanking). Section 73.663()b)1 of the FCC Rules requires power measurements be done at 75 percent blanking, with no setup. In some cases this may not be possible or convenient.

FCC rules specify a multiplier of 1.68 for converting average power to peak power. Average power is what the typical wattmeter such as the Bird "Thru-Line" or Coaxial Dynamics meters indicate. The calorimetric method also gives the result as average power. The 1.68 multiplier is valid *only* for video with a blanking level of 75 percent and no setup (zero APL).

Dane Ericksen at Hammet and Edison Consulting Engineers sent me a copy of the derivation of the 1.68 multiplier and a formula for finding the multiplier for values of APL other than zero. It was easy to modify his formula to include different levels of sync as well.

The derivation, although interesting, would require more space than I have here. Here's a quick summary. Dane divided the video waveform into several parts- each having an amplitude and voltage level- equalizing pulses, vertical serrations, horizontal sync pulses, H blanking minus H sync, active video, time at blanking for vertical serrations and time at blanking for equalizing pulses.

By multiplying the percentage of time during a frame that the signal is at each voltage level (sync, blanking and video) by the voltage level and summing the results, we can find what percentage (or ratio) the peak power (sync tip) is to the average level.

If you wanted to take the time, you could even calculate what the ratio would be for your color bars. If you would like to see the full derivation, leave me a note on CompuServe (70255,460) and I will E-mail it to you.

Figure 1 shows the formula. The sync amplitude is in IRE and is measured from sync tip to actual blanking The APL is measured in IRE above O IRE units, even if the blanking, because of long or short sync, is not at zero. The APL may either be negative (short sync, no setup) or positive.

Waveform adjustments

Before making these measurements, be sure to adjust the waveform monitor vertical gain or demodulator video level so that the zero carrier pulse is at the top of the scale on the waveform (120 IRE mark) and the sync tip is at the -40 IRE unit mark. This is very important! (One reminder is that if your sync is not 40 IRE units, your APL will not be at 75 percent blanking and will have to be entered too.)

In a calculator program, you may want to include an option where you can set A = B if the active video equals blanking. A and B are squared in the formula to convert the voltage ratios to power ratios.

If you are using a spectrum analyzer in the linear mode, set it so that with no signal the trace is on the bottom scale marking and then, with the signal, adjust the RF gain of the analyzer so that the tip of sync is eight major divisions above it. Every major division is 20 IRE units, and you can measure blanking and APL this way.

A spectrum analyzer will be more accurate than some demodulators for measuring video. Telemet demodulators, for example, have an adjustment for setting zero carrier pulse amplitude. If it isn't set right, your readings will be off. A number of years ago several TV stations in California cited for improper video levels were found to be using misadjusted Telemet demodulators.

Figure 2 offers two quick examples of how the formulas work. I will post a copy of an IBM PC program I wrote to do these calculations on Compuserve's Broadcast Professional's Forum. Look for it there under filename A2PRAT.EXE, or send me an E-mail. It will also be in the next revision of my calorimetric power calculation program. The ratio calculations are simple enough to program into a hand-held calculator or into a spreadsheet to make a look-up table. I hope you find them useful.

Figure 1.

Ratio of Average Power/Peak Power =

$0.08 + 0.133 * B^2 + 0.786 * A^2$

B =(160 - (sync amplitude from tip to blanking) / 160

A =(120 - (APL above nominal O IRE blanking) / 160

Figure 2.

Sync level =37 IRE units below blanking

No video setup above blanking, so A=B

A=B= (160 -37) / 160=0.76875

Average Power to Peak Power Ratio=

$0.08+0.133 * (0.76875)^2+0.786 * (0.76875)^2=$

0.08+.0786 + .4645=.6231

Taking the reciprocal to obtain the peak to average ratio: 1/0.6231 = 1.605.

Multiply average power times 1.605 to obtain peak power with 37 IRE units of sync.

Another example:

Sync levels=42 IRE units below blanking

Video setup at 7.5 IRE units above blanking

First, find APL with references to 75% blanking:

(42 units measured sync)-(40 units normal sync)=2

(7.5 units above blanking)+2(from above)=9.5 units (APL)

A=(120-9.5)/160=0.6906

B=160-42)//160=0.7375

Average Power to Peak Power Ratio =

$0.08+0.133 * (0.7375)^2+0.786 * (0.6906) = 0.52723$

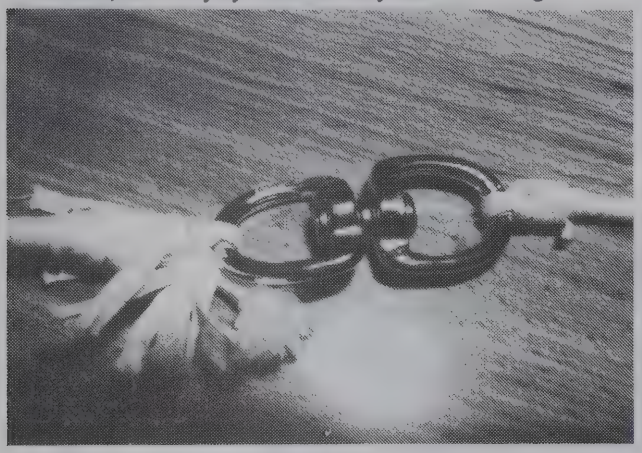
Peak to Average Ratio=1/0.52723=1.8967

ATV HIGH ALTITUDE PAYLOAD RECOVER SYSTEMS

A "how to" primer for the edge of space experimenter

Dave Pelaez AH2AR/8

With the increased popularity of high altitude amateur radio experiments, many clubs and groups have planned and launched a wide assortment of different types of experimental packages. One of the problems during the planning phase involves trying to obtain the information needed so a "reinvention of the wheel" doesn't become necessary. From a "payload" standpoint, the groups are only limited by their imagination in their determination on what kind of electronics will be flown. However, recovery systems usually have to be caged to

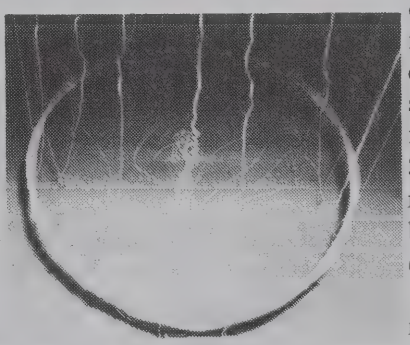


the "tried and true" category. A poor recovery system could easily become a one way ticket to potential disaster. Many of the payloads that have been flown can easily exceed the $1000 mark, and, of course, it is highly desirable to recover the payload so it might fly again. A free fall from 100,000 feet will not harm the electronics... it's the sudden death stop as it encounters terra ferma that could result in an unplanned circuit board "redesign". Needless to say, even property damage shouldn't be ruled out. A parachute failure on an eight pound payload could do a lot of damage, as it has had plenty of time to build up momentum. Bowling balls make lousy snowflakes.

There are several alternatives available in your search for a parachute recovery system for your "edge of space" payload. One alternative is the utilization of a NOAA type radiosonde parachute that is produced by the VIZ Corporation. This waxed paper parachute has a Blaze-orange canopy that makes it easier to spot in the event that the payload gets hung up in a tree or lands in the middle of a corn field. This simple, inexpensive parachute has shroud lines that merge in the center of the canopy, and has a "tie-off" available for attachment to the balloon line. This simple design allows the shroud lines to support the weight of the payload, as the

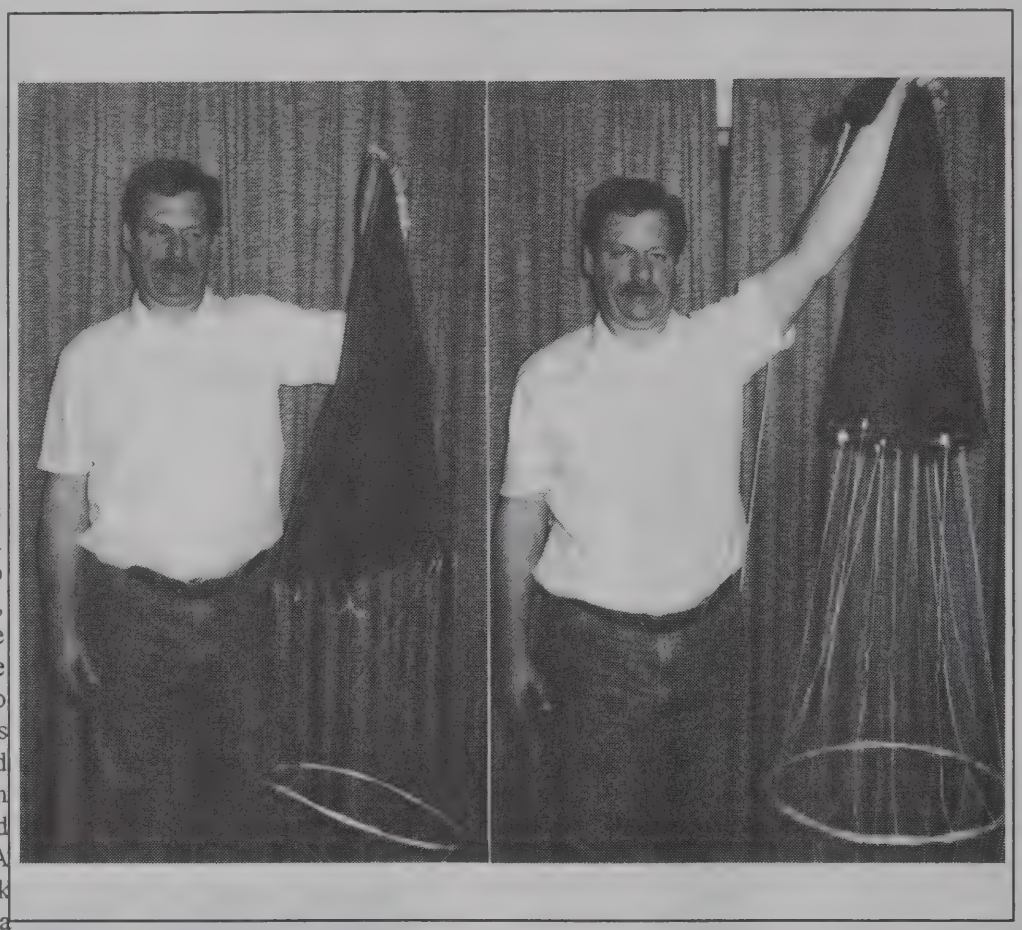
parachute stretches between the bottom of the balloon line and the top of the payload line. Another nice feature about these radiosonde parachutes is the addition of a "shroud hoop". The hoop keeps the shroud lines spread apart around the circumference of a wooden ring, and this hoop greatly helps in assuring a clean opening of the parachute. Although packages heavier than five pounds have been used with the VIZ parachute, the additional weight can cause the paper to tear as the parachute descends at a "higher than spec" velocity.

A much better parachute system is available from Loc Precision, Inc. With some simple modifications, this rip-stop nylon parachute (originally designed for very large model rockets) is a perfect choice for high altitude balloon flights. Also available in Blaze orange, these parachutes come in sizes from 14 inches to 70 inches in diameter. Priced from about $4 to $29, the parachutes represent a real bargain, as they can be re-used, and have proven to be extremely reliable.



Several modifications need to be accomplished in order to be able to press them into service for balloon flights. Modification number one involves the placement of a "tie-off", so the top of the parachute can be supported by the helium balloon, and in effect, becomes a "line" that supports the weight of the payload during ascent. This is when you go to your golf bag... what??? Yea... golf bag. By using a golf "wiffle" ball as an anchor point, this ball will allow you to add a tie off line without damaging the rip stop parachute.

Place the wiffle ball underneath the parachute canopy, and position it in the exact center of the parachute. Tie a nylon line directly underneath the gathered fabric-encased ball, and tie a secure knot, insuring that the fabric remains snug around the anchor point (see photo). As a fail safe insurance measure, it is always a good idea to bind the nylon knot with some waxed floss, so there is no chance that Murphy will not untie your knot during mid-flight. Before proceeding to modification number "2", you may want to add swivels to both ends of the line connecting to the bottom of the balloon and the top of the parachute. Experience has shown that during ascent, the balloon sometimes will distort and have a tendency to "cork screw" on the way up. This movement will transfer down to your payload, and cause the parachute shroudlines to twist up, and this condition could cause an unexpected "streamer". A sock with a rock in it also makes a lousy parachute, as this is what your payload and parachute might look like as it heads down from whence it came. Additionally, viewing several minutes of ascent video, watching the horizon rotate at 25 RPM will make you remember to bring your Dramamine for the next flight.



Modification number two includes the addition of a shroud ring to the Loc Precision parachute. If you are lucky enough to be able to salvage a shroud ring from a VIZ parachute, this addition will be very worthwhile. However, if you do not have access to a shroud ring from Viz, then an equally as good a source for the hoop will be found at Walmart, in the sewing section. (Try to explain this one to your XYL.) Embroidery hoops are available for seventy seven cents at Walmart, and they are also the right diameter, if you purchase the 14 inch version. For an eight pound payload, the LHPC-44 (44 inch parachute) with the 14 inch shroud hoop will work just fine. Placing this hoop at about 36 inches from the bottom of the parachute fabric with the shroud lines placed at equal spacings around the hoop, will approximate the correct spacing for the shroud hoop. Add tape to the lines on the shroud ring to keep the lines from migrating around the hoop. At balloon burst, the 16 separate shroud lines will now be less likely to tangle during the thin air vacuum freefall, and the parachute will be in a "half open configuration" and will help the parachute blossom open sooner.

You can write Loc Precision, Inc. for their catalog and price listings at 1042 Iroquois, Macedonia, Ohio 44056 (216-467-4514).

Although recovery systems are never 100 percent reliable, when you utilize common sense and use good materials, your chances of success increase exponentially. Just remember to warn the gophers if you decide to cut corners on your payload recovery system!

PHOTO above: TIM (N8NEU) models the modified Loc Precision Parachute and the VIZ radiosonde parachute

Previous page:
PHOTO left: Pictured is the marine type swivel used between the balloon and parachute. Using these will decrease chances of dreaded "streamer".

PHOTO top right: Encased Wiffle golf ball in parachute fabric. This modification allows an anchor point to be used on the Loc Precision Parachute.

PHOTO bottom right: A closeup of the shrouded hoop. Hoop pictured has been salvaged from a VIZ radiosonde parachute. Hoops are also available at your local stitchery (see text).

from puny watts to big watts on 900 MHz

Henry KB9FO

Motorola announced a new NPN power transistor, resembling our favorite power bricks, which will provide up to 185 watts OUTPUT at 900 MHz. The typical operation is 150 watts out for 20 watts in. The device is a class AB amplifier, and the spec sheet shows good linearity. Five watts will provide 50 watts, 10 watts will provide 80 watts and 15 watts will come out as 125. A maximu of 24 watts input will provide 185 watts output. The following information is the the Motorola data sheet on the MRF 899 transistor.

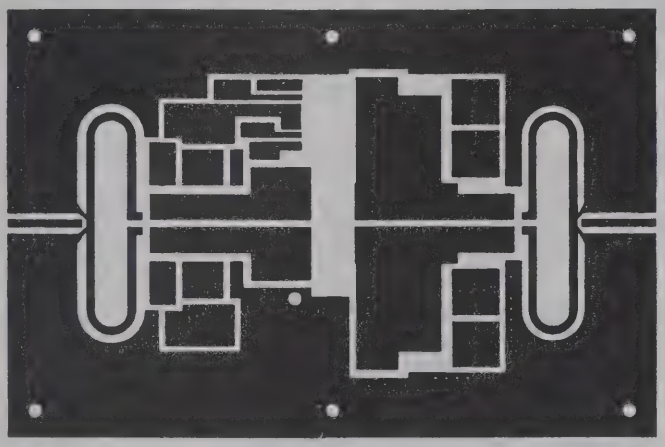


Figure 10. MRF899 Test Circuit Photomaster

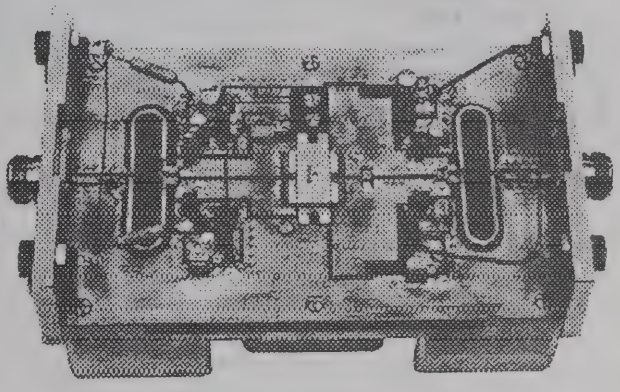


Figure 9. Photo of 900 MHz Test Circuit

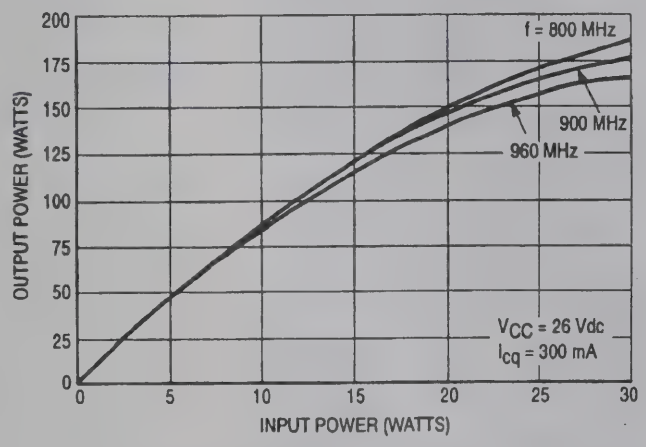


Figure 2. Output Power versus Input Power

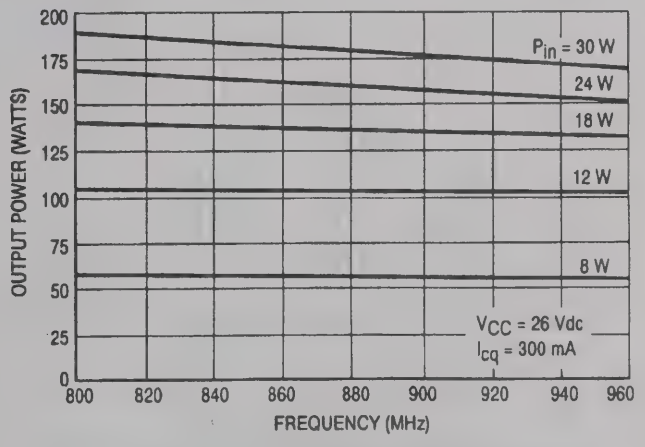
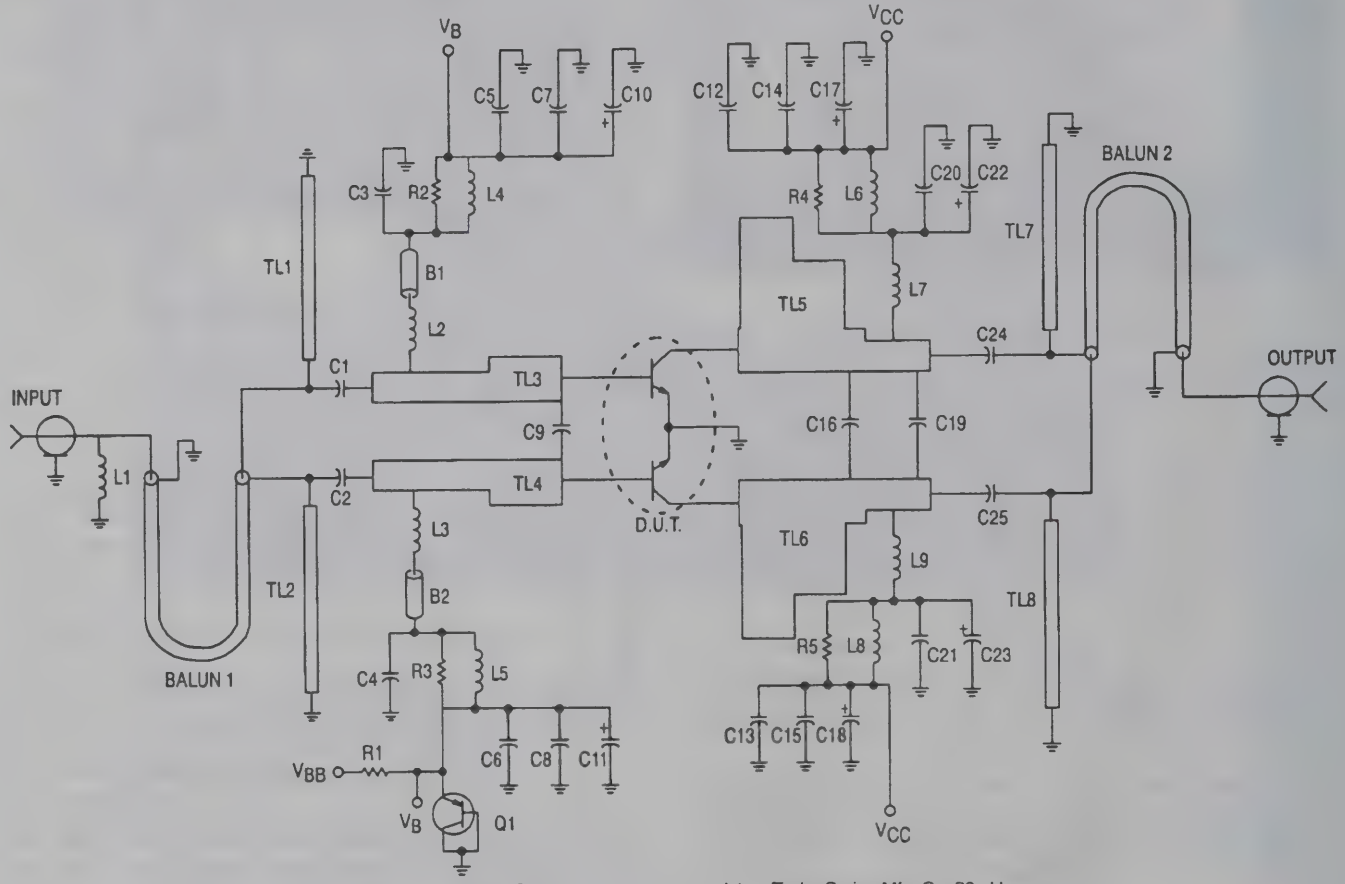


Figure 3. Output Power versus Frequency

ELECTRICAL CHARACTERISTICS — continued (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 26 Vdc, I_E = 0, f = 1.0 MHz) — for information only. This part is collector matched.	C_{ob}	—	75	—	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain V_{CC} = 26 Vdc, P_{out} = 150 Watts (PEP), I_{cq} = 300 mA, f_1 = 900 MHz, f_2 = 900.1 MHz	G_{pe}	8.0	9.0	—	dB
Collector Efficiency V_{CC} = 26 Vdc, P_{out} = 150 Watts (PEP), I_{cq} = 300 mA, f_1 = 900 MHz, f_2 = 900.1 MHz	η	35	40	—	%
3rd Order Intermodulation Distortion V_{CC} = 26 Vdc, P_{out} = 150 Watts (PEP), I_{cq} = 300 mA, f_1 = 900 MHz, f_2 = 900.1 MHz	IMD	—	−32	−28	dBc
Output Mismatch Stress V_{CC} = 26 Vdc, P_{out} = 150 Watts (PEP), I_{cq} = 300 mA, f_1 = 900 MHz, f_2 = 900.1 MHz, VSWR = 5:1 (all phase angles)	Ψ	No Degradation in Output Power			

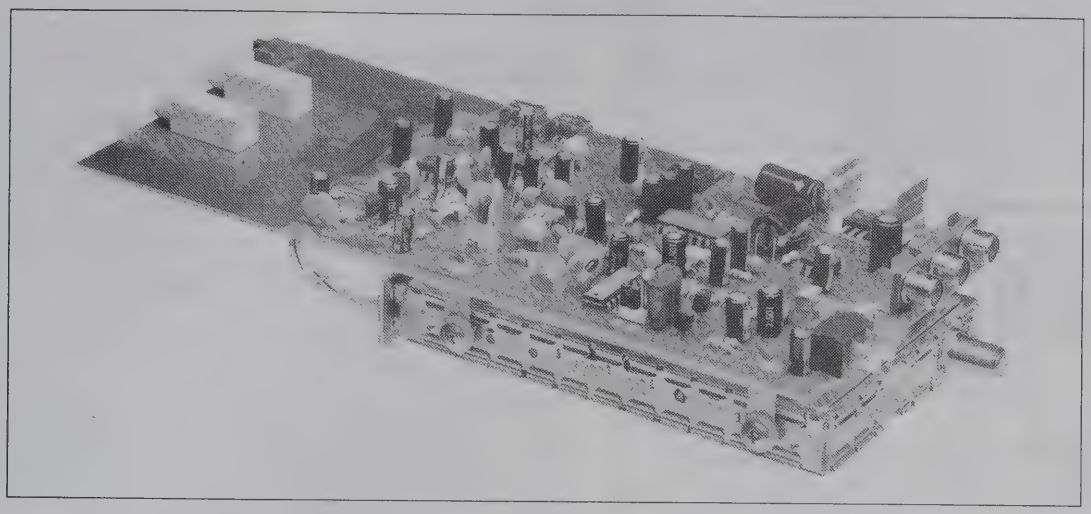


C1, C2, C24, C25 — 43 pF 100 Mil ATC Ceramic Capacitor
C3, C4, C20, C21 — 100 pF 100 Mil ATC Ceramic Capacitor
C5, C6, C12, C13 — 1000 pF 100 Mil ATC Ceramic Capacitor
C7, C8, C14, C15 — 0.18 µF AVX Ceramic Chip Capacitor
C9 — 9.1 pF 50 Mil ATC Ceramic Capacitor
C10, C11, C17, C18, C22, C23 — 10 µF, 50 V Electrolytic Panasonic
C16 — 3.9 pF 100 Mil ATC Ceramic Capacitor
C19 — 0.8 pF 100 Mil ATC Ceramic Capacitor
Q1 — Bias Transistor BD136 PNP
Balun 1, 2 — 2.20″ 50 Ohm 0.088″ O.D. Semi-Rigid Coax

L1 — Taylor Spring Mfg, Co. 20 nH
5 Turns 24 AWG 0.059″ I.D. Choke
L2, L3, L7, L9 — 4 Turns 20 AWG 0.130″ I.D. Choke
L4, L5, L6, L8 — 12 Turns 22 AWG 0.150″ I.D. Choke
R1 — 2x 56 Ohm 1 Watt Resistor
R2, R3, R4, R5 — 4x 39 Ohm Chip Resistors
TL1, TL2, TL3, TL4,
TL5, TL6, TL7, TL8 — see Photomaster
B1, B2 — Ferrite bead
Ferroxcube #56-590-65-3B
Board — 1/32″ Glass Teflon, ε_r = 2.55, Keene (GX-0300-55-22)

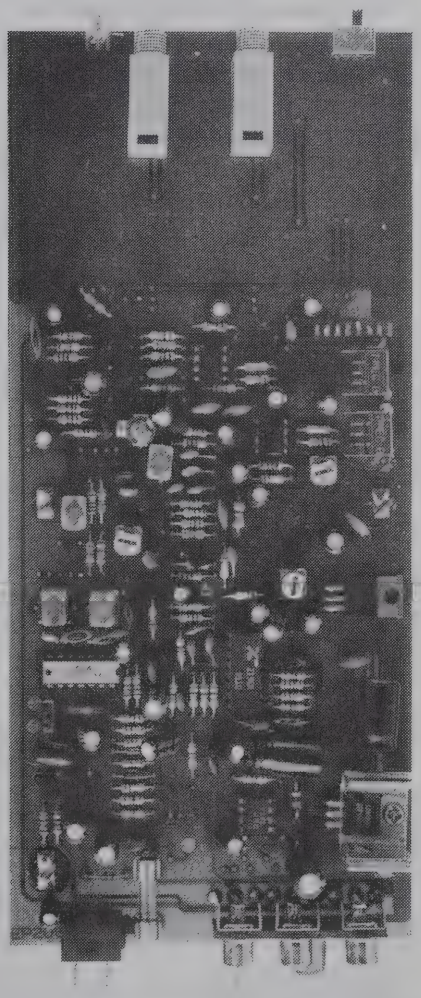
Figure 1. 840–900 MHz Broadband Power Gain Test Circuit

EURO 600 SAT MODULE



TUNING

POWER LED | CHANNEL 900 - 2000 MHZ | AUDIO 5,2 - 8,5 MHZ | AFC | $\overline{\text{AFC}}$



VIDEO LINEARITY

VIDEO 0,5 - 1,5 VOLTS P/P

AUDIO LEVEL

$\overline{\text{CLAMP}}$ CLAMP

16 MHZ / 27 MHZ — B/W

LNB / $\overline{\text{LNB}}$ — POWER

AFC - CTR

AUDIO RANGE

AUDIO | VIDEO | BASEBAND 50 HZ - 8,5 MHZ

+ 17,5 Vdc

400 mA $\overline{\text{LNB}}$

: + 17,5 V DC	
: 400 mA	$\overline{\text{LNB}}$
: Type F connector	
: 950 - 2000 MHZ ADJ.	
: 5,2 - 8,3 MHZ	
: - 65 dBm	
: 6,5 dB	
: Switchable (on,off)	
: 16/27 MHZ switchable	
: 50 HZ - 5 MHZ	
: Pal/NTSC/SECAM CCIR 405-1	
: neg/pos. switchable	
: 1V P/P ADJ.	
: RCA Femelle	
: RCA Femelle	
: RCA 50 HZ - 8,5 MHZ	

PICOTRONIC
Inh. H. Boertzler • Zollamtstraße 48
D-6750 Kaiserslautern • W.-Germany
Telefon 06 31/2 91 87 • Fax 49-6 31/2 95 79

Variable-Tuned 922 Mhz ATV Receive Converter

Doug Ingram ZL2TAR

Introduction

A 922 Mhz ATV transposer can be used to extend the transmit coverage of a standard ATV repeater, such as the 443 Mhz input, 615 Mhz output unit at Belmont, Wellington. The construction of a 922 Mhz ATV transposer is described elsewhere in this issue.

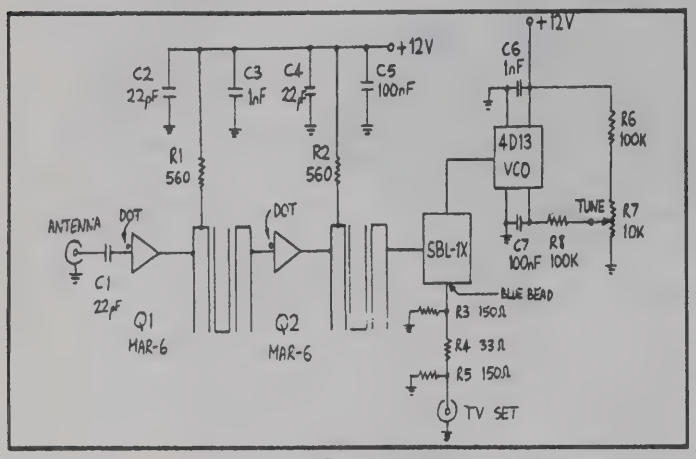


Figure 1.

This article describes a simple high quality converter for receiving the output of the transposer.

922 Mhz ATV Variable-Tuned Receive Converter

The converter receives ATV signals from the 922 transposer and converts them to Channel 3 (62.25 Mhz vision carrier), usable by a standard TV receiver. In Kaikohe, Waikato, Gisborne, Nelson, Canterbury, Southland, and other areas where Channel 3 is used by the local broadcast TV transmitter, the converter output can be on Channel 2 (55.25 Mhz) instead. Figures in brackets later in this article refer to the different operating conditions for the Channel 2 output version.

The converter is based on the receiving section of the 902 to 928 Mhz Down East Microwave (DEM) transverter, described in *QST*. The DEM design is crystal controlled, for use with narrow band modes. The crystal and the oscillator-multiplier stages are very expensive. The much cheaper but less accurate frequency control of a cellular radio VCO is quite acceptable for ATV.

The converter features two low noise MAR-6 Miniature Microwave Integrated Circuits (MMICs) as RF pre-amplifiers, two three-stage bandpass filters and a 1000 Mhz extended frequency range SBL-1X double-balanced mixer. The input-to-output gain is around 16 dB.

Cheaper, lower performance, converter designs are, of course, possible but be warned, the commercial frequencies adjacent to the amateur bands are in widespread use for cellular telephones and fixed point-to-point links. This means that the greater selectivity of the two three-stage bandpass filters, the better linearity of the SBL-1X double-balanced mixer, and the low phase noise of the cellular radio VCO, used in this design, are well worth the extra cost.

SBL-1X Double-Balanced Mixer

The SBL-1X mixer consists of two balun transformers and four closely matched diodes in a double-balanced ring configuration, all in a shielded can. The mixer is designed for use in 50 systems. The SBL-1X mixer is linear to about 1 mW of signal input, far more than "Amateur" mixers will tolerate. To obtain this performance, the mixer typically needs 5 mW, or more, oscillator injection for best performance. The cellular VCO provides the mixer with 8 mW on 860 Mhz (867 Mhz).

The conversion loss of the SBL-1X mixer is 6 dB, better than any other design of passive mixer. The channel 3 IF output passes through a 6dB pad, to isolate the mixer from the relatively poor input SWR of most TV receivers. The total 12 dB loss of mixer and pad is overcome by the gain of Q2, the second low noise MMIC.

The phrase "double-balanced" means that both the signal input and the local oscillator input are greatly attenuated on the mixer output pin; both signals are balanced by the internal balun transformers and by the precise matching of the diodes. This is particularly important when converting from frequencies next to the intensively used cellular and fixed link UHF bands. Strong local oscillator or input signal feed through, typical of inferior mixes, can overload the input stage of the television receiver.

Do not substitute the cheaper SBL-1 for the SBL-1X, as the internal pin connections are different and the performance, at 922 Mhz, is grossly inferior.

Converter Construction Details

Figure 1 shows the circuit of the converter. Figure 2 shows the stripline side of the PCB and Figure 3 shows the SBL-1X and VCO side of the PCB.

All seven capacitors used in this converter are 0.1" chips. Other capacitor types should not be used. The chip capacitors need to be held in position by a match or blunt toothpick while being soldered. If the capacitor is not held in position the capillary action

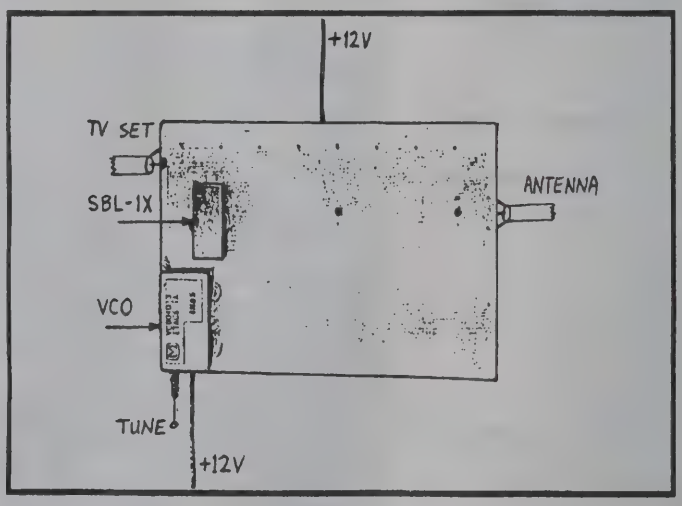


Figure 3.

of the molten solder will pull it to somewhere you don't want it to go. Trying to move an incorrectly positioned capacitor, after initial soldering, can damage it. The particular type of 22 pF capacitors used in this converter have been chosen because they

922 MHz RX

are self-resonant at 922 Mhz.

All resistors are modern 1/8W carbon, or metal, film, with 8 mm long bodies.

C1, 22 pF, couples RF from the antenna to the input pin of Q1, the first MAR-6 MMIC, without shorting out the internal bias voltage present on the input pin, marked with a dot of paint.

R1, 560 drops the 12 V supply to Q1. R1 is connected to the RF deadpoint on the first half-wave resonator of the first three-

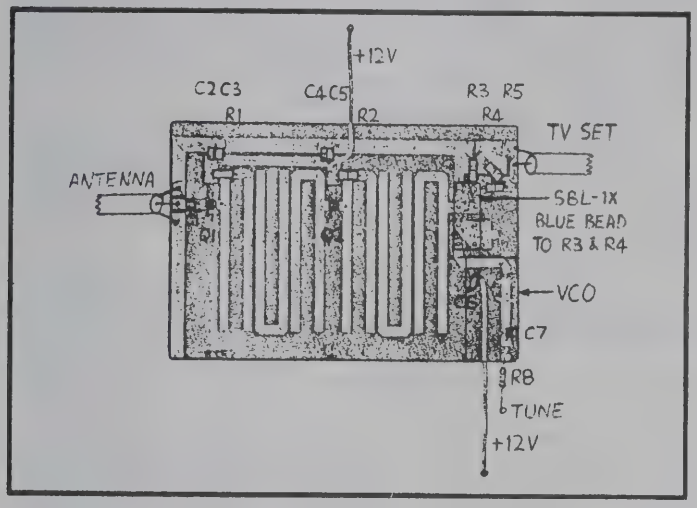


Figure 2.

section bandpass filter. The third resonator feeds the signal to Q2.

C2, 22 pF and C3, 1 nF, bypass the 12 V supply to Q1.

R2 560 , drops the 12 V supply to Q2. R2 is connected to the RF dead point on the first half-wave resonator of the second three-section bandpass filter. The third resonator feeds the signal to the SBL-1X mixer. Note that the blue bead on the mixer is connected to R3 and R4.

C4 22 pF and C5 100 nF bypass the 12 V supply to Q2.

R3 and R5, 150 , and R4 33 from the 6 dB output pad.

C6 1 nF, bypasses the 12 V supply to the cellular VCO. C7, 100 nF, bypasses the tuning voltage to the VCO. These capacitors should be positioned as shown, for lowest phase noise.

R6, having ten times the resistance of the tuning pot R7, reduces the 12 V supply to a maximum tuning voltage of about 1.1 V. R8 100 k, and C7 smooth the tuning voltage. The tuning pot can be mounted anywhere by R8 should be mounted close to C7.

Operation

Connect a regulated +12 V supply to the points shown. The converter should draw between 60 and 70 mA, about 15 mA to each MAR-6 and 35 mA to the VCO. If the current is much higher, you probably have a solder-bridge or short circuit. Correct the short before proceeding. If the current is much lower you may have missed a connection, have a short circuit, or have damaged Q1, Q2 or the VCO. Connect the 922 Mhz antenna coax to C1 and the TV set coax to R5. Turn on the TV receiver and tune it to Channel 3, 62.25 Mhz (or Channel 2, 55.25 Mhz). Adjust the tuning pot, R7, for 0.6 V (1.0 V) on the wiper. Use an accurate high impedance voltmeter.

You should now receive the ATV repeater test pattern, via the 922 Mhz ATV transposer.

The VCOs are mass-produced to close tolerance. If the VCO tuning voltage, for best picture, is more than 0.3 V from the stated values it actually means that your TV set is off-tune!

The converter, either as a kit or ready built, is available ex-stock from Branch 74, the Wellington VHF Group, PO Box 12-259, Wellington.

Crystal Controlled Version

A crystal controlled version of the receiver converter, or the whole transmit/receive transverter, for narrowband modes, is also available from Branch 74, the Wellington VHF Group. The 86 to 96 Mhz crystals are quite expensive. The crystals, the frequency multiplier stages and the larger printed circuit board increase the cost of this version. Apart from the much better frequency stability, the noise figure and gain is the same.

References

"A Single-Board, No-Tune 902 Mhz Transverter", *QST*, July 1991, pp.25-29.

"Variable-Tuned 922 Mhz ATV Receive Converter", *Q-Bit*, Branch 74 Magazine, January 1992, pp.18-21.

Reprinted from "Break-in" New Zeland ham radio magazine.

Construction of a 922 Mhz ATV Transposer

Doug Ingham ZL2TAR

Editors note: While this project applies to using the 600 Mhz band which is not available in Region 2, the project can be modified easily for use on 450 or other bands as desired. From "Break-In" New Zeland ham magazine.

Introduction

A variable tuned ATV receiving converter for the 921 to 928 Mhz ATV band is described elsewhere in this issue.

This article describes the construction of the 921 to 928 Mhz output ATV transposer.

Why a 922 Mhz ATV Transposer

A 922 Mhz ATV transposer can be used to extend the transmit coverage of a standard ATV repeater such as the 443 Mhz input, 615 Mhz output unit at Belmont, Wellington.

The transposer works by converting the 615 Mhz ATV from the repeater to the standard TV IF of 38.9 Mhz for high selectivity filtering and gain control. This IF is then converted to the required output frequency of 922 Mhz, again without modulation.

Legal Issues

The Amateur band is 922 to 927 Mhz as described in various recent FMTAG columns. Amateurs are not permitted to transmit ATV in the 922 to 927 Mhz Amateur band. Applications for Branch-owned ATV transposers occupying the non-Amateur band of 921 through 928 Mhz are considered on a case-by-case basis, coordinated through FMTAG. The ATV frequencies were chosen to minimize problems with commercial operators below 921 Mhz

922 MHZ Transposer

and above 928 Mhz, and for mutual compatibility between ATV and narrow Amateur modes between 922 and 927 Mhz. A 615 Mhz input, 922 Mhz output, ATV transposer would, for example, operate on these frequencies:

	Input (Channel 39)	Output (Channel 77)
Vision VSB limit	614.00	921.00
Vision Carrier	615.25	
922.25		
Sound Carrier	620.75	
927.75		
Upper limit	621.00	
928.00		

The Vision Carrier frequency of 922.25 Mhz is often referred to as 922 Mhz for simplicity; the extra 0.25 Mhz being understood.

The frequencies above 928 Mhz and below 921 Mhz are occupied by commercial traffic and it is important that Amateur transmitter outputs are fully filtered so that no interference is caused to these services. In particular the output power amplifier can produce unwanted out-of-channel signals on 916.75 and 933.25 Mhz. The FMTAG coordination and test procedure is designed to ensure that no interference to the commercial services occurs.

High power and medium power 922 Mhz ATV transposers require Surface Acoustic Wave (SAW) Intermediate Frequency (IF) filters and notch-and-bandpass output filters to meet the NZRFS standard of output purity. Restricted coverage transposers of about 5 mW output can be built using simplified circuits.

Block Diagram

The block diagram of the transposer is shown in Figure 1. The following description follows the signal path through the transposer from input to output. The transposer receiver is shown in the upper part of the figure; the transposer transmitter is shown in the lower part of the figure.

Transposer Receiver

The transposer input signal, having a vision carrier of 615.25 Mhz and a sound carrier of 620.75 Mhz is received from the Belmont ATV repeater on a horizontally polarized Uda-Yagi antenna.

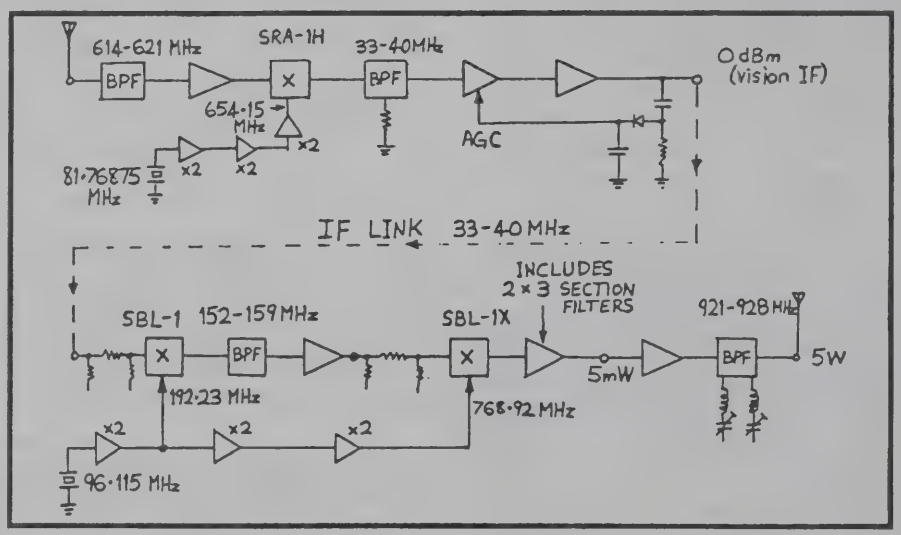
A five-pole interdigital filter prevents strong broadcast UHF TV signals, such as SKY, from overloading the receiver input stages of the transposer. After low noise amplification, and further bandpass filtering, the signal is frequency converted to the standard TV IF, in a double-balanced high-level SRA-1H mixer. The standard IF is 38.9 Mhz vision carrier and 33.4 Mhz sound carrier.

A broadband termination on the output of the mixer ensures maximum performance; all signals below 60 Mhz, including the wanted IF, continue to the following stages, all signals above 60 Mhz, including HF harmonics, the conversion image and other unwanted signals are diverted into a dummy load.

The main selectivity of the transposer is a SAW filter, passing only 40.0 to 32.2 Mhz, a little less than the specified 7 Mhz bandwidth. The IF SAW filter, in effect, prevents the radiation of out-of-band input signals which, when transposed, would lie below 921 Mhz or above 928 Mhz.

Automatic gain control and amplification, to a fixed (vision carrier) output level of 1 mW, 0 dBm, follows the SAW filter. This level complies with the interface standard published on page 4 of December 1991 *Break-In*.

This completes the receiver module.



Transposer Transmit Exciter

As mentioned earlier, special care is taken to eliminate interference to non-Amateur services on adjacent frequencies.

The transmit up-converter is based on the transmit section of the 144 Mhz input, 902 Mhz output, Down East Microwave (DEM) transverter, described in *QST*. Image rejection is insufficient when converting direct from 38.9 Mhz to 922.25 Mhz, so a double conversion scheme is used. Double conversion usually implies two crystals, two oscillators and two multiplier chains, as well as two mixers, with more spurious signals being possible. In this design one crystal is used, eliminating all of these problems.

First we need to choose the IF. Ideally, this should be somewhere near the geometric mean of 38.9 Mhz and 922.25 Mhz, approximately 189 Mhz. The ideal frequency often needs to be modified to avoid unwanted mixer products and to obtain practical multiplication chain factors. A search for unwanted mixer products identified 153 Mhz as being suitable for the intermediate frequency.

The 96.115 Mhz crystal oscillator output is first multiplied by two, to give a 192.23 Mhz injection for the SBL-1 first mixer. This gives intermediate frequencies of 153.33 Mhz vision carrier, and 158.83 Mhz sound carrier. The 192.23 Mhz is then multiplied again by a total factor or four to give the 768.92 Mhz injection for the second mixer. The second mixer produces the required output

SOMETIMES MY WIFE'S COMPLAINING ABOUT MY LATE NIGHT HAMMING GETS TO BE A PAIN IN THE REAR

WHAT IS IT, NOW? SEEMS LIKE YOU'RE ALWAYS YELLING ABOUT SOMETHING!

900 MHz Transposer

frequencies of 922.25 Mhz vision carrier and 927.75 Mhz sound carrier.

The second conversion mixer features a 6 dB pad, a 1000 Mhz extended frequency range SBL-1X double-balanced mixer, two three-stage bandpass filters, a low noise MAR-6 and a power output MAV-11 Miniature Microwave Integrated Circuits (MMICs) as RF amplifiers. The IF input to RF output gain is around 10 dB.

Cheaper, lower performance, converter designs are, of course, possible but be warned, the commercial frequencies adjacent to the amateur band are used for cellular telephones and fixed point-to-point links. This means that the greater selectivity of the two three-stage bandpass filters, and the better linearity of the SBL-1X double-balanced mixers are necessary to achieve the required output purity.

Do not substitute the cheaper SBL-1 for the SBL-1X as the internal pin connections are different and the performance, at 922 Mhz is grossly inferior.

A standard level 38.9 Mhz vision carrier IF input of 1 mW produces a 922.25 Mhz vision carrier output of 5 mW. This output is pure enough to be fed directly to an antenna, giving coverage distance of about 1 km. Alternatively, it can be fed to a power amplifier and bandpass/notch filter combination.

This completes the transmit exciter module.

Transposer Power Amplifier

Two operating modes are common in television power amplifiers.

In the separate sound-vision mode, used in high power transmitters, the sound is amplified in a dedicated amplifier, separate from the vision amplifier. The sound and vision are combined by passive circuits subsequent to the amplifiers.

In the combined sound-vision mode, used in transposers and low power transmitters, the sound is amplified together with the vision. This transposer uses the combined sound-vision mode.

Combined Sound-Vision Power Amplifier

The addition of a sound carrier, at 13 dB below vision sync power, requires the vision sync power to be set at -4 dB, relative too the peak envelope power (PEP) capability of the power amplifier. Since television transmissions are rated by vision sync power such an amplifier is said to be derated, or "backed off", by 4 dB.

The 12 W PEP-rated Hitachi PF0011 thick film hybrid power amplifier has been chosen for the transposer output stage. This produces 5 W vision sync power and 250 mW Sound power when "backed-off" 4 dB. When operated at these power levels, with a vision carrier of 922.25 Mhz and a sound carrier of 927.75 Mhz, the module produces the following out-of-channel signal levels, relative to the vision sync power:

916.75 Mhz -45 dB
933.25 Mhz -50 dB

These levels do not meet NZRFS requirements, for this power level of better than -57 dB, so additional filtering, after the output power amplifier stage, is required. This filter typically has a bandpass characteristic, plus notches on 916.75 and 933.25 Mhz.

The 5 W output plus filter and feeder losses totalling -2 dB and an antenna gain of 9 dBi produces the maximum NZRFS permitted vision EIRP of 25 W.

Conclusion

This paper has discussed the factors involved in the construction of television transmitting equipment operating in the 921 to 928 Mhz band and the precautions taken to ensure successful, non-interference, operation with Fixed Services on adjacent frequencies.

References

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"ATV Extenders", *Break-In*, March 1988, pp.18-19.

922-027 Mhz bandplan. "FMTAG" column, *Break-In*, March 1991, p.3.

"A Single-Board, No-Tune 902 Mhz Transverter", *QST*, July 1991, pp.25-29.

"FMTAG" column, *Break-In*, December 1991, p4.

COMET

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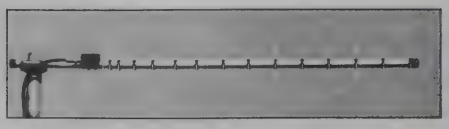
Polarization: Vertical or Horizontal
Length: 4' 5"
Weight: 7 lbs. 11 ozs.
Mounting Mast Diameter: 1"-2½"
Connector: N-Type
Construction: All Aluminum



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1250-1300MHz
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5/8 Wave x 4 446MHz
5/8 Wave x 9 1200MHz
Gain: 446 9.4dB,
1200 12.8dB
Impedance: 50 ohms
VSWR: 1.5:1 or less
Max. Power: 446 150 watts,
1200 50 watts
Length: 7' 5"
Weight: 2 lbs. 8 ozs.
Connector: N-Type
Construction: Heavy Duty Fiberglass

CA-1221S
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Base/Repeater Antenna
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Collinear
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Impedance: 50 ohms
VSWR: 1.5:1 or less
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Length: 8' 6"
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Mounting Mast Diameter: 1¼-2½ inches
Connector: N-Type

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Base 13 Element Yagi
904-920 MHz
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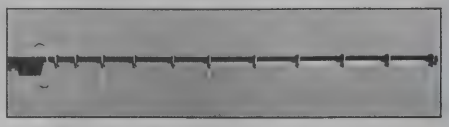
Construction: Aluminum



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		Max. Power	Insertion Loss
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CM-300	200-240MHz	60 watts	0.2dB
CM-400	420-460MHz	50 watts	0.2dB
CM-420	140-460MHz	50 watts	0.1-0.2dB
CM-900	840-950MHz	60 watts	0.2dB
CM-1200	1225-1325MHz	60 watts	0.25dB

Measurements: 2.25"w x 2.25"h x 1.1"d
Weight: 5.25 oz.
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CM-420, 900 & 1200 have N Connectors

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Connector: N-Type
Construction: Heavy Duty Fiberglass

CF-4130 446/1200MHz
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900-1400MHz 0.3dB
Band Rejection: 55dB Down
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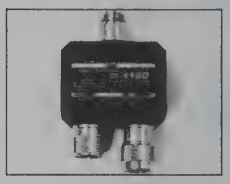
446MHz 500W PEP,
1200MHz 200W PEP
Connectors: N-Type



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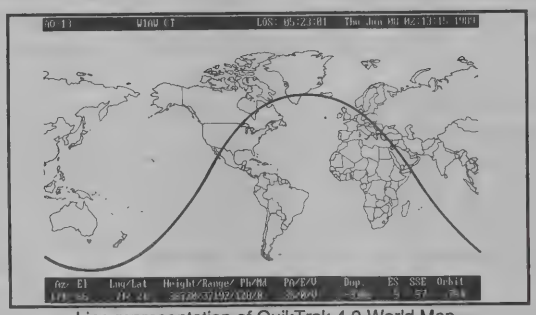

Line representation of QuikTrak 4.0 World Map

QuikTrak 4.0

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ALL YOU NEED TO KNOW ABOUT PAL

Randy Hoffner

Are you acquainted with the PAL television system?

Lest you think I am becoming overly familiar, I am referring to the color video encoding system named *Phase Alternating Line* and commonly referred to by the acronym PAL. In the United States, the compatible color television system called NTSC is the standard. NTSC and PAL are both broadcast and production standards because the same video waveform that is transmitted over the airwaves is frequently used in the production environment as well.

The monochrome video waveform on which NTSC is built is based on a 60 hertz field rate. With interlaced scanning, it takes two fields to make a frame, and therefore the frame rate is 30 per second. In order to make all the numbers work out with compatible color, the frame rate for NTSC was reduced by one-tenth of one percent to 29.97 per second. In much of Europe and in other parts of the world, the 50 hertz based PAL color video standard is used for both television production and transmissions.

A third color television transmission standard, SECAM, also based on 50 Hz, is also used in many countries of the world. If I ever figure out how it works, maybe I will write a column on it. SECAM is an abbreviation for the French *Systeme Electronique Couleur avec Memoire* (electronic color system with memory); and not an acronym for a System Essentially Contrary to Accepted Methodology, as some think. SECAM is not typically used for production because of the difficulties encountered in mixing its FM subcarriers; production for SECAM transmission has traditionally been done in PAL and then converted, but now component production is often directly encoded.

Figure 1 - Chrominance Axes and Phases of the Burst

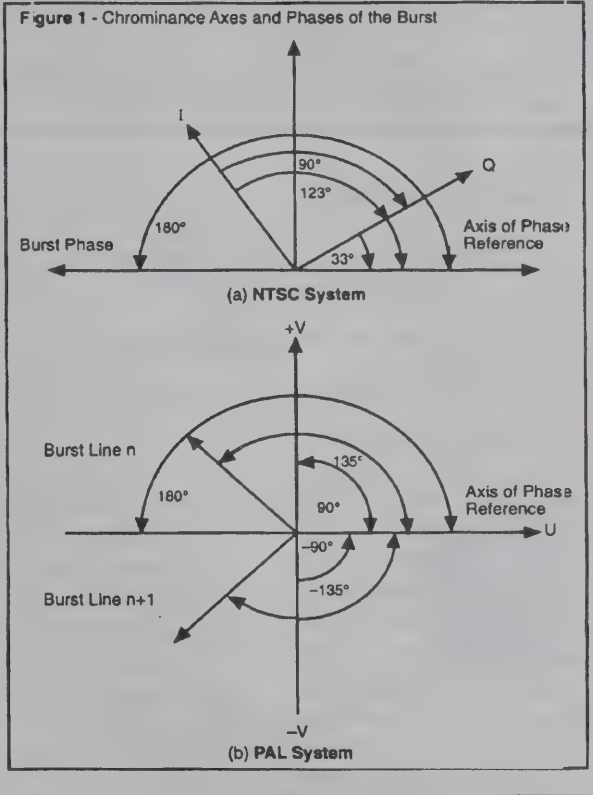
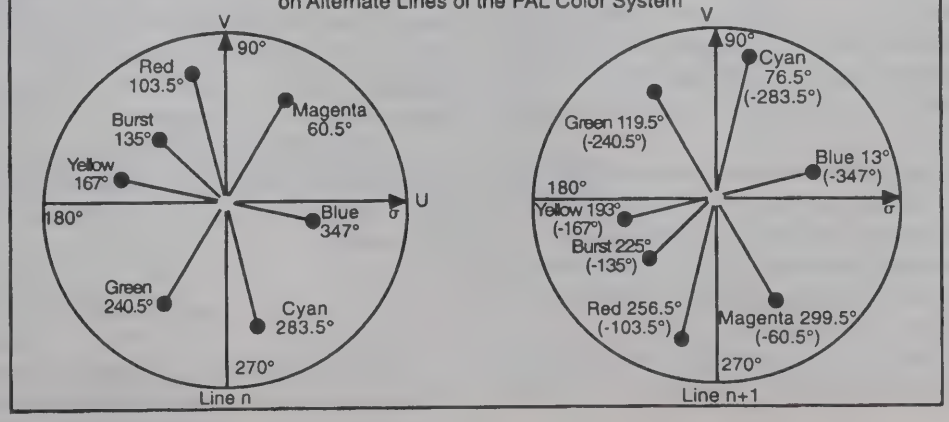


Figure 2- Phases of Subcarrier Representing Primary Colors and Their Complements on Alternate Lines of the PAL Color System



designations

The CCIR designations for world television transmission systems include a letter (such as M, N, B, L, et al) and a color encoding system (NTSC, PAL, or SECAM) where color television is transmitted. (Yes, the CCIR 1990 Report indicated that there were still countries that did not transmit color television.)

The letters define parameters such as number of scanning lines, field repetition rate, spectrum location (VHF or UHF), channel bandwidth, and location of the aural and visual carriers within the transmission channel.

For example, the United States television transmission system is designated M/NTSC: a 6 Mhz wide channel that uses 525-line video, and whose color encoding system is NTSC.

A common PAL transmission standard is B/PAL; a VHF channel 7 Mhz wide that uses 625-line video and PAL color encoding.

Lining up

NTSC is a color encoding technique that is used exclusively with the 525-line transmission system that is known as CCIR Standard M. PAL is a color encoding technique used primarily with various 625-line television systems, although there are some variations. Brazil, for example, uses M/PAL, which is 525-line PAL. The PAL color system is a variation of NTSC, which was developed by Dr. Walter Bruch of the Telefunken Company of Germany.

There are a number of PAL transmision standards, but the differences between them are primarily in RF transmission parameters. For 625-line PAL program production, a common set of technical specifications, routinely referred to as PAL-B, is used. In the following description,

the term "PAL"

PAL

refers to the latter.

NTSC and PAL are similar in some respects, and quite different in others. Both systems use interlaced scanning, and both have a 4:3 aspect ratio. In contrast to NTSC's 525 lines per frame and 29.97 frames per second; PAL has 625 lines per frame and 25 frames per second.

Flicker threshold

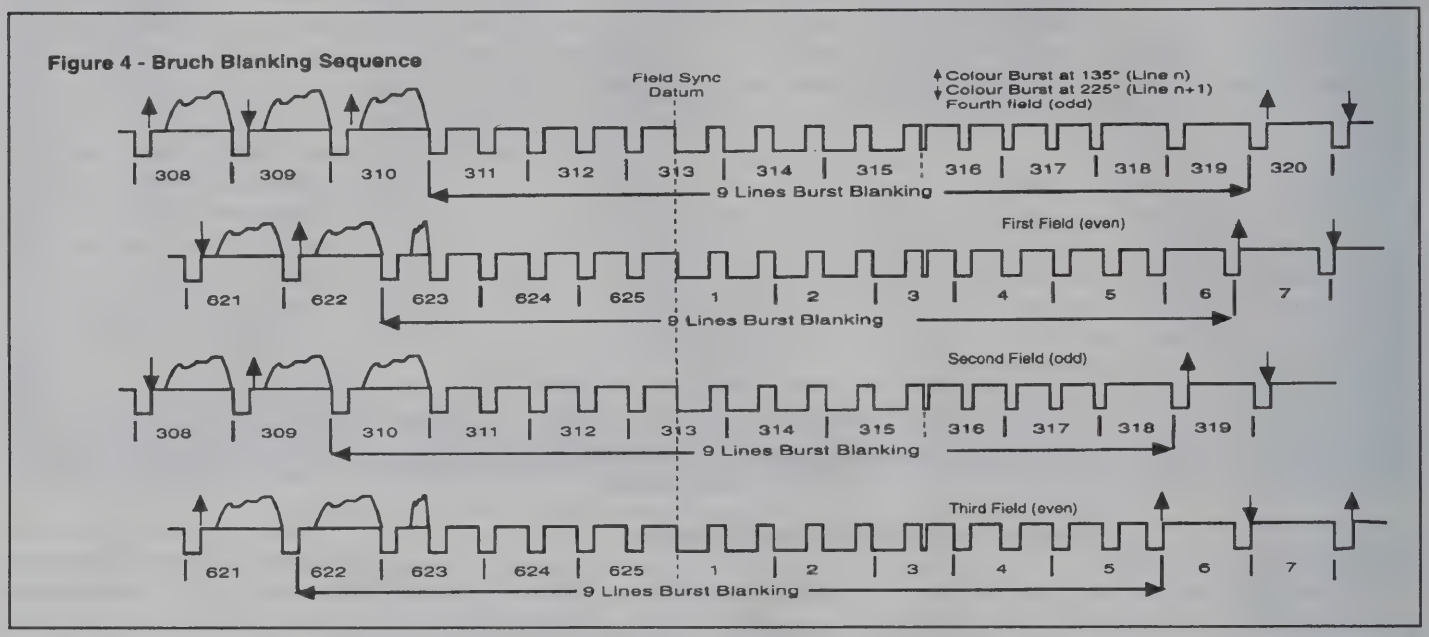


Figure 4 - Bruch Blanking Sequence

The extra 100 lines per frame give PAL greater vertical resolution than NTSC, but PAL's frame repetition rate of 25 hertz gives it less motion resolution than NTSC. Twenty-five hertz is also a low enough frame rate to impart perceptible flicker, while NTSC's frame rate is usually above the "flicker threshold". The 50 hertz field rate of PAL is based on the 50 hertz power line frequency common in the countries where it is employed, just as NTSC's (almost) 60 hertz field rate is based on the US power line frequency of 60 Hz.

A line of PAL video viewed on a waveform monitor looks superficially similar to its NTSC counterpart, but closer examination reveals some differences. In the NTSC system, amplitude is measured in IRE units; PAL amplitudes are measured in millivolts. IRE units are not applicable to PAL video, and if an IRE-scale graticule is used on a PAL waveform monitor, errors in level will result.

Table 1 compares the amplitude characteristics of NTSC and PAL video signals. Table 2 contains some of the important scanning parameter differences between NTSC and PAL.

Color signals are transmitted in both systems by suppressed-carrier amplitude modulation of two subcarriers in quadrature. In NTSC, these subcarriers are called I and Q.

Figure 1 (a) shows that the Q axis is at 33 degrees, the I axis is at 123 degrees, and the burst is at 180 degrees in NTSC. In PAL the subcarriers are called U (unvarying) and V (varying). Figure 1 (b) shows that in PAL, the U axis is at zero degrees, and for a given scanning line *n*, the V axis is at +90 degrees and the burst is at 135 degrees.

Alternate view

As I previously stated, PAL is an acronym standing for *Phase Alternating Line:* The phase of the V-axis component is reversed on alternate lines. For line *n+1*, the V axis is called -V and is located at -90 degrees, and the burst is at -135 degrees: a mirror image of line *n*. A given color is thus represented by subcarrier of a particular amplitude and one of *two* phases, depending on the polarity of V-axis modulation.

When looking at color bars, the NTSC vectorscope displays seven dots: one for burst at 180 degrees, and one for each of the three primary colors and its complement. The PAL vectorscope, when viewing both the V and -V components, displays two burst dots, at 135 degrees and -135 degrees, respectively.

There are also two dots for each primary color and complement. For example, a red dot (R) will be seen at 103.5 degrees as in NTSC, but there will also be a red dot (r) at -103.5 degrees. The PAL vec-Figure 2 illustrates the vectorscope display for V and -V lines, respectively. In Figure 2 the phase angles for both line n and line n+1 are represented in positive, or counterclockwise degrees. As in Figure 1 (b), the phase angles for line n+1 may also be thought of in negative, or clockwise, degrees. For example, line n+1 burst may be thought of as either -135 degrees or as +225 degrees.

The NTSC color subcarrier frequency is 3.58 Mhz, while the color subcarrier frequency of PAL is 4.43 Mhz. The PAL color burst consists of 10 cycles of subcarrier as opposed to NTSC's 9-cycle burst.

Incoherent bursts

Unlike NTSC's, PAL's bursts are not coherent because of a 25 hertz offset in the subcarrier frequency. When looking at NTSC

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PAL

burst on a waveform monitor in the expanded horizontal mode, where all bursts are overlaid, the display appears as two clean, interleaved sine waves 180 degrees out-of-phase with each other (Figure 3(a)).

When the same display is observed in PAL, the burst waveforms do not appear to be locked. Instead of interleaved sine waves, the burst display is a "fuzzy" envelope in which no coherent waveforms can be discerned (Figure 3(b)).

Another peculiarity of PAL is caused by a technique called the Bruch Blanking Sequence, a method of adjusting the relative phasing of color bursts before and after burst blanking during the vertical sync period. The 9-line period in each field during which color bursts are blanked is effectively "moved around" in a four-field sequence, illustrated in Figure 4.

The observed effect of the Bruch Blanking Sequence is that around the vertical blanking interval, some bursts appear to be flashing on and off.

In NTSC, the phase of color subcarrier is offset by 90 degrees in each successive field, so that the SCH relationship repeats each four fields, making a four-field color sequence. In PAL, the SCH relationship repeats each eight fields, resulting in an eight-field color sequence. As someone once said, in PAL you can edit every 20 minutes!

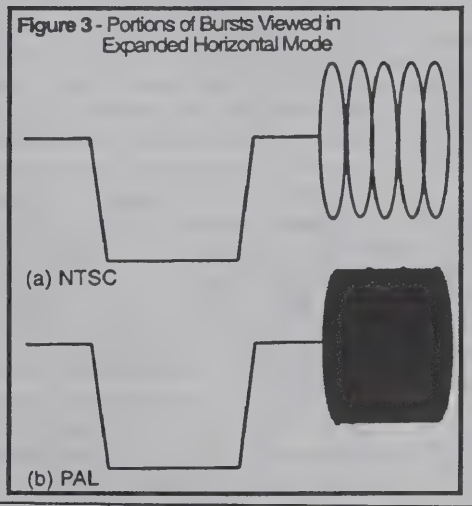

Figure 3 - Portions of Bursts Viewed in Expanded Horizontal Mode

Table 1 - The amplitude characteristics of NTSC and PAL

Parameter	NTSC	PAL
P-P Video Amplitude	140 IRE (1.000 V)	1.000 V
Peak White Level	100 +0/–2 IRE (714 mV)	700 ± 20 mV
Picture Black Level*	7.5 ± 2.5 IRE (54 mV)	0 + 35/-0 mV
P-P Picture Amplitude	92.5 IRE (660 mV)	700 mV
Sync Level	–40 ± 2 IRE (-286 mV)	-300 ± 9 mV

*Note that PAL has no setup

Table 2 - Scanning parameter differences between PAL and NTSC

Parameter	NTSC	PAL
Field Frequency	59.94 Hz	50 Hz
Frame Rate	29.97 Hz	25 Hz
Line Frequency	15,734 Hz	15,625 Hz
Line Period	63.56 µS	64.00 µS
Line Numbering	Per Field	Per Frame

PAL and NTSC are related closely enough that in many ways they appear similar, but, as we have seen here, there are some significant differences between the two.

Acknowledgement: Figure 1 was drawn using information from CCIR Report 624-4, "Characteristics of World Television Systems," published in "Reports of the CCIR", Annex to Volume XI-Part 1, Geneva 1990. Figures 2 and 4 were adapted from Sections 4.3 and 4.4, respectively, of "The IBA Code of Practice for Television Studio Centre and Outside Broadcast Performance," 1980 Edition, Issue 2, London, 1980.

Randy Hoffner is director of research and development at NBC Labs. He may be reached at 212-664-4733.

The w6ORGy Notes

By Tom O'Hara, W6ORG

TO DEVIATE OR NOT TO DEVIATE - THAT IS THE QUESTION

For many years there have been articles extolling the virtues of FM ATV. Most of them telling all the plusses with some misapplication of theory and little of the minuses. DB's were thrown about worse than antenna advertisers.

Unless directly asked, I have not said much because I could not see very many new people paying $200 plus extra for a FM ATV receiver over standard AM TV to do the same function. This assumes they also have a video monitor too.

Sure you can convert a surplus satellite receiver, but they are set for 11 MHz deviation so a video amp has to be added to bring this level up 1 V p-p for the standard amateur 4 MHz deviation. Since these are made for -60 dBm input, total gain of the down converter and post amp needs to be about 42 dB to get to the noise floor. The filter is 32 MHz wide where one about half that would give 3 dB more sensitivity and less interference potential. While not a big problem for the solder slingers this degree of difficulty often slows one from jumping on.

To get ATV going in any area I have observed that it takes three or more people to be around regularly putting out video and to help others get on. In many cases all it has taken is a suggestion to try putting a good outside antenna on their cable ready TV set to cable channels 57 through 60 (421.25 - 439.25 MHz) to see their first AM ATV picture with no money expended.

Those pushing FM were mainly ones with the gear looking to sell it and or get other people on with whom they could swap pictures - it's no fun if nobody else is watching. That's fine, amateur radio should be used to experiment with all kinds of modes and as long as it doesn't interfere with others or prevent them from doing their own thing, I'm all for it.

But if you are going to try to get another person to join you and invest some of their money and time on a new facet of the hobby, it should be based on technical facts to enable making an informed honest decision.

So let's look at the "FM advantage". There are a number of variables that result in the advantage. The limiter is the most important one in the system. This part of the receiver determines the capture ratio (ability to reject other on channel but weaker signals) and, along with de-emphasis, the reason the video to noise improvement can change so much faster above threshold than an equivalent AM video signal.

WHAT PRICE BANDWIDTH?

Other than cost, occupied bandwidth is the biggest drawback to FM. Using the 4 MHz deviation standard and 4.5 MHz sound, the occupied bandwidth is 17 MHz or the equivalent of 2 AM ATV channels with nothing in-between. Some European systems use 6.5 MHz sound which works out to 21 MHz. The higher the deviation, the faster the rate of picture to noise improvement above threshold. When the deviation equals the modulation frequency (modulation index=1), the improvement approaches the same as AM. But if the capture ratio, thanks to the limiter, is good, many stations can occupy the same frequency without interference. You can't do that with AM because you can easily see interference down to about 40 dB below peak sync in the picture.

On the 400 MHz band in most populated areas of the country FM ATV will interfere with just about anybody else using the band. 900 is becoming more and more occupied by all kinds of other services but might support an FM ATV channel at 915 MHz. 1252 MHz in all but the major high population centers would probably work best unless FM voice links or digital systems are in place. I suggest checking with your areas coordination council to find out if there are any dedicated systems on the air that you might wipe out before you spend any money.

Getting back to the capture ratio, most FM receivers available now are not as good as ones made many years ago before the satellite TV revolution. PLL and quadrature detector IC's made receivers lower cost and easy to tweak in production. But with these, out went the hard limiter that gave as much as a 6 dB capture ratio (signals 6 dB or more weaker on channel would not degrade the picture). I have measured modern ones at 13 dB or worse. While either are better than AM it may not satisfy the areas that need more than one ATV channel.

In fact compare an old commercial FM voice transceiver with any of the modern ham ones on a busy simplex channel - I'll bet you can hear a whole bunch of conversations on the ham rig and very few on the old one that uses a hard limiter and discriminator.

Broadcast TV microwave links use FM with well designed receivers having low capture ratios so that they can use the same channel in an area with careful setup of narrow beam width dishes and polarity to keep the undesired signal below the capture ratio level of the desired signal at a given site. It would be very difficult of course with AM. So FM ATV really has a proven application for linking on 1.252, 2.430 or 10.25 gHz.

ON THE ATV DX THRESHOLD

You can see AM video before FM video primarily because of the noise bandwidth difference. Most TV sets have a 3 MHz 3 dB bandwidth which works out to a noise floor of -109 dBm or .8 uV in a perfect receiver. You could see sync bars and maybe some large black call letters in the picture. With a perfect FM receiver and a 15 MHz filter this goes up to about -92 dBm or 5 uV assuming a 10 dB carrier to noise FM threshold. The lower the bandwidth, the lower the noise floor and higher the carrier to noise ratio.

Boiling it down it means that FM will not be seen until about the equivalent of P2 for the same level of AM. At that point FM rapidly takes over and improves to P5 at the level of P3-4 in an AM picture. While testing and comparing a 23cm system from Parabolic, the sparkle free (like snow in an AM system) level was about -72 dBm or 50 uV. P5 in an AM system is about 150-200 uV.

NEXT TIME

I hope to have tested 3 or 4 of the available amateur FM ATV receivers and have the results here.

CU in Dayton,

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2522 Paxson Lane
Arcadia CA 91007
(818) 447-4565

10 GHz Fundamentals

Part 1: Waveguides

The imminent arrival of a 10GHz repeater for the Bristol area has spurred a good deal of interest in 10 GHz operation. In a previous article for P5, we outlined some ways of obtaining a 3 cm carrier for possible use as a TV transmitter using Gunn diodes and DRO pucks. This article explains how some of the more basic parts of the "plumbing" associated with operating at 10 GHz work ... waveguide.

The function of waveguide is to conduct RF energy from one part of the transmitter or receiver to another. Waveguide is preferred to coax for ease of use and low losses, coax is a form of waveguide since it "guides" waves but we usually refer to a hollow tube as waveguide . It is possible to use coax at frequencies as high as 50 Ghz, but it is difficult to make coax accurately enough to prevent useful RF energy being lost, or to stop "moding" . Moding is where the dielectric space between the conductors form a cavity that can resonate, absorbing yet more power.

How does a square pipe propagate microwave energy? It is easier to visualise a parallel transmission line, think of the pink twin core aerial wire that used to be popular on FM stereo receivers, that is a 300Ω balanced transmission line. A transmission line has an electric field between the conductors that will remain contained between the conductors as long as the conductors remain balanced. See figure 1. Containing the electric field ensures that most of it arrives at the other end. A quarter wave (λ/4) shorted stub presents an open circuit at the appropriate frequency even though it is a dead short at DC.

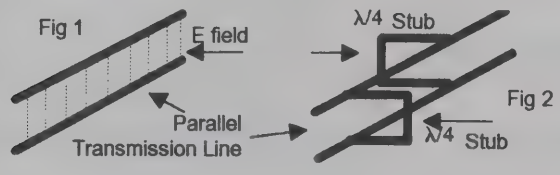

Fig 2

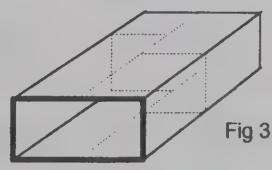

Fig 3

In Figure 2 we can see that placing any amount of shorted λ/4 stubs either side of the transmission line will have little effect on the RF power transmission. Placing an infinite amount of λ/4 stubs on either side of the line will form a tube (figure 3), what we call a waveguide. We may also surmise that the λ/4 stub need not be a squared off U shape, if the λ/4 stub was hemispherical, then the waveguide would be circular, we could use circular waveguide, but it will not keep its polarity along any but a short length of guide. This is a phenomena satellite dish owners know as "skew". In microwave ATV we need to retain the polarity to ensure that the transmitting station and the receiving station see each other. The polarity we quote to each other always refers to the electric field generated by the radiating device, in figure 3 the electric field is between the broad faces of the waveguide. Therefore a signal radiated by the waveguide in figure 3 is said to be vertical.

Recall that the λ/4 stubs are only λ/4 stubs at a particular frequency, this is the main reason for waveguide being frequency critical. At 10 GHz, we would use WG16 type waveguide, the WG16 dimensions are roughly 23mm x 10mm and has a frequency range of about 8 to 12 GHz . The relationship between frequency and choice of waveguide is also affected by the possible modes of propagation in waveguide. The electric field is the most meaningful to us as described above, but with every electric field there is a perpendicular magnetic field. We refer to these as Transverse Electric and Transverse Magnetic or TE & TM modes of propagation, there is also a TEM mode but this mode is not possible in waveguide. The main mode in rectangular waveguide is known as TE_{10} (pronounced T, E, one, zero). The "one" is the amount of minima's / maximas in the electric field over the broad face and "zero" is the amount in the narrow face.

We get energy in and out of the waveguide by using "probes" and "feeds". A "probe" is sometimes called a monopole, it usually couples a coax feed into a waveguide as a small vertical antenna set into one of the broad faces. The electric field at the probe aligns directly to the electric field in the waveguide. A "feed" will usually couple the 1Ω waveguide into free space, these will be covered in the next article on horns, feeds and dishes.

The mechanics of using waveguide are made simple by the vast range of WG16 parts available to the TV amateur. The circular flange fitting used to be the most widely used, but today the more elegant rectangular flange is very common. It is critical that the mating of the flange be as accurate as possible in order to minimise leaks. Some flanges have an RF choke built in to the flange so that should a leak occur into the gap when two flanges are mated the RF is reflected back into the cavity. Angles, twists, attenuators and filters are all widely available on the surplus market, but may be fabricated as needed from brass plate provided that care is taken to ensure that the inner surfaces are smooth and of the correct dimensions.

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March 13-14 ** Northern Florida Section Convention, Orlando, FL
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April 3 ** Georgia State Convention, Perry, GA
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April 3-4 + Spokane Amateur Radio Clubs, Spokane, WA
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John Mears, N8IPJ
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April 16-19 ** Northern California DX Convention, Visalia, CA
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April 18 + Rockford ARC, Rockford, IL
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April 23-25 Dayton Hamvention

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53 Hayward ST., Yonkers, NY 10704

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Don Kerovac, K9NR
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May 16 + Triple States RAC, Wheeling, WV
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May 22 x PHD KC Mid-West AR Convention, Kansas City, MO
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June 4-6 ** Texas State Convention, Arlington, TX
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July 24 * New England Division Convention, Manchester, NH
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August 21-22 + Duke City Hamfest, Albuquerque, NM
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August 22 + St. Charles ARC, St. Charles, MO
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September 4 + Miami County ARC, Troy, OH
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Sept 17-19 * Southwestern Division Convention, Ventura, CA
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November 5-7 ** West Gulf Division Convention, Houston, TX
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1994

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Picture this—a friend calls Joe Ham at his office. The DXpedition from Kneecap Island has just come on 20 meters.

After thanking his friend, Joe dials his home telephone number, punches the Touch Tone pad a few times and suddenly 4Q2AB, operating from Kneecap Island, is heard in the handset. Joe says "4Q2AB/K7RIE—5-9" a couple of times into the mouthpiece. Then he smiles, and hangs up the telephone, knowing that he has just worked rare Kneecap Island—country number 319 on his DXCC.

*How? Joe had an ARE **HamLink** installed on his rig.*

With it, Joe can control virtually any function of a ham rig (which is able to be controlled by a serial computer interface port) from any TouchTone telephone—anywhere in the world! ***HamLink*** users never miss a schedule, net check- in or a new country They can even "rag-chew" or call CQ with their home rig, over the telephone line.

HamLink is contained in a 8"X5"X2" box which sits alongside your rig. It connects to the microphone, external speaker, CW key, and serial port jacks of an Icom, Kenwood or Yaesu transceiver. ***HamLink*** also connects to your existing telephone line—there is no need to add a second phone line. ***HamLink*** will function perfectly even if you also have an answering machine connected to the same telephone line.

*How? **HamLink** has built-in "smarts" and knows that it is you calling!*

Once the connection is made, you must enter your secret access code. This prevents unwanted people from accessing your equipment. If the code is correct, you hear a beep and the signals on the frequency to which the equipment was left tuned. By the way, you can connect an external relay to ***HamLink*** to control the AC power to your station.

Others can use your station too.

Model ARE-60 ***HamLink***

If you give your secret code to friends, they can access your station in the same manner. If you have friends who live in a condo, where antennas are not permitted, or who cannot have a powerful station, you can let them use your equipment when you are at work. DX clubs can create "mega-stations" that club members can use for chasing those rare ones. We even know of a ham who is buying a small lot outside of town to put up an antenna and tall tower. He will access it via the phone line from his condo.

Controlling your radio is easy!

Once you log into your ***HamLink***, you use the Touch Tone pad on the phone to control your radio. You can change bands and frequency, tune up or down, switch modes (AM/SSB/FM /CW), scan, run split VFO or virtually any other feature that your radio is capable of. Incidentally, ***HamLink*** also works on computer controlled receivers, like the Icom R-7000, for remote monitoring.

The "star" or asterick key, controls the transmitter. On SSB, pressing the key once causes the transmitter to activate just like a push-to-talk button. When transmitting you simply speak into the telephone mouthpiece. When you are done speaking, you again press the "star" key, which deactivates the transmitter. You hear the receiver audio coming back to you.

You can even send full break-in CW over the phone line! If you switch to CW mode, the "star" becomes a telegraph key! You may not break any CW records, but it will allow you to snag that "rare one" who operates CW and only comes on while you are at work.

HAMLINK

Q&A

We've received hundreds of calls and letters with questions on *HamLink*. They are probably similar to questions you may have.

*Can I buy an instruction manual for **HamLink**?*

Certainly. A complete instruction manual is available for $10.00 from ARE. The $10.00 can be applied toward the later purchase of ***HamLink***. A coupon is included with each manual for this.

Can I make the interface cable?

Sure. We supply optional cables for Icom, Kenwood, or Yaesu (see list), in case you don't have the time or facilities to make one. But if you are a "builder," the diagram for all three cables is included in the manual.

*Will your **HamLink** work with my radio?*

Does your rig have a CI-V input (Icom) or a computer port (Kenwood and Yaesu)? If so, **HamLink** will control it. We've tested it with almost all Icom radios and it works fine. Same for Kenwood. Check with us if you operate a Yaesu. They use different control codes on various rigs. **HamLink** works with the FT-890, 990, 1000, 747GX and 757GXII. We may have added others by the time you read this.

Can I send high-speed CW from the office?

You bet! We make an optional CW adapter that connects to your remote telephone. You can plug a keyer into the adapter and send CW up to 40 WPM over the phone line. The adapter also has a headphone jack and provision to use a Yaesu YH-2 headset-mic.

How can I actually tune the radio remotely?

If you know what frequency and band you want to operate on, you simply enter this on the telephone keypad (see control codes on page 3). But you can also tune up and down the band at various rates (see keypad drawing). You can scan preset memories or frequencies.

What if I lose track of the frequency?

That's easy! Press #91# and you hear a digitized voice telling you to what frequency the radio is tuned. Forget the mode? Press #93# for both frequency and mode. And it's not one of those voices that sound like a robot. It's the voice of our engineer and we pack him in every box!

What about adjusting volume?

Manufacturers do not make provision for controlling volume via the computer serial port on most radios. You will have to preset the volume to a normal level for your telephone line. The same is true for the microphone gain although the ALC will prevent you from overmodulating the radio. By the way, the instruction manual tells you how to set up the audio levels for your installation.

Can I work split frequencies for DXpeditions?

You bet! Look at the command structure on page 3. You have total control over VFO A and B. You can set them to any frequency to cover any situation.

*I'll bet **HamLink** can't control my antenna.*

You lose! There is an accessory output for controlling external relays. You can wire these outputs to turn your antenna or run the tower up and down. By the way, I shouldn't tell you this, but we are working on a talking antenna controller that will tell you, where your antenna is pointed!

What else can I do with the accessory outputs?

Use your imagination! The outputs control relays. What can you do with relays?

Doesn't this type of product require FCC type acceptance?

Anything that connects to a telephone line must be approved under Part 68 of the FCC Rules and Regulations to insure it will not damage the telephone network. Also products with a CPU must meet Part 15 to insure it does not radiate interfernce. ***HamLink*** meets both of these government requirments and is type accepted by the FCC.

Command Structure For *HamLink*

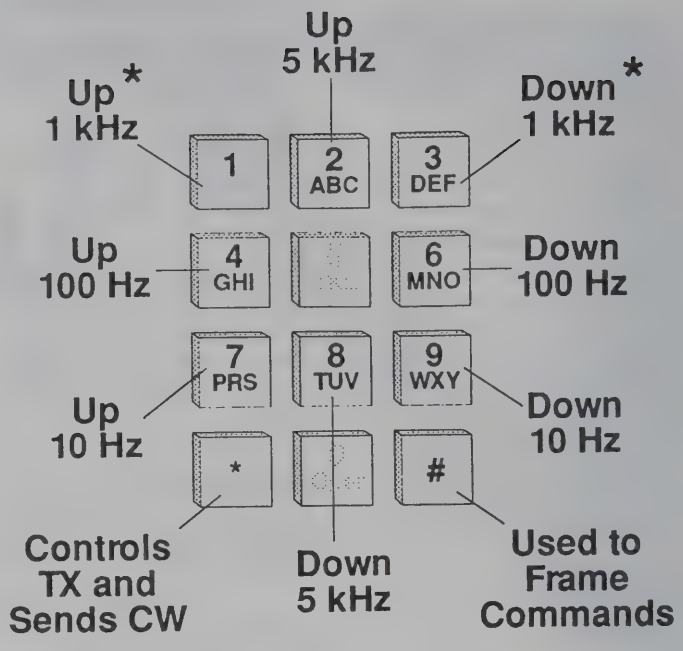
The following is a list of commands for *HamLink*. Note that all commands (other than those for frequency) are framed with a #.

#11#	Set mode to LSB (default)
#12#	Set mode to USB
#13#	Set mode to AM
#14#	Set mode to CW
#15#	Set mode to RTTY (see note 1)
#16#	Set mode to narrow FM
#17#	Set mode to wide FM
#2nnnn#	Set current VFO
#2nnnn*nnn#	Set current VFO (see note 2)
#31#	Select VFO A
#32#	Select VFO B
#33#	Enable simplex mode (default)
#34#	*Enable split operation*
#35#	Set VFO B = VFO A
#51#	Select memory mode
#52#	Select VFO mode (default)
#53nn#	Select memory channel number
#55#	Start scan (in memory or VFO mode)
#59nn#	Set max. num. memory chns. to NN
#6n#	*Turns logic lines on and off*
#88n#	*Waiting time before hangup (n = minutes, 0 = infinity) without receiving Touch Tone input.*
#89n#	*Set phone answer mode* *0 = normal mode* **1 = answer on first ring** *2 = answer on 2nd ring etc. up to 9 rings*
#91#	Announce frequency information
#92#	Announce mode information
#93#	Announce both freq. and mode info.
#94#	Announce VFO B freq. information
#0#	Hang up (also turns power relay off)

note 1- use not recommended

note 2- This command sets the current VFO to the specified frequency. The frequency is expressed in kilohertz. There must be at least four digits after the 2 key in the command string and before the ending # key. The frequency entry may contain a decimal point and Hertz resolution using the * key after the kilohertz entry.

note 3- Commands in italics are not operative on demonstration unit.



* Scans memory in memory mode

Test HamLink ForYourself

Amateur Radio Engineering has set up a demonstration ***HamLink*** that you can access. We've also established a dedicated phone line connected to the unit. You are invited to call (206) 880-6050 and put ***HamLink*** through its paces.

We have disabled the transmitter since we have no idea of who will be calling the demonstration. The disabled features are shown in italics in the command list.

When the phone answers, and you hear four beeps, enter the "secret" code 1234. You will then hear an announcement of the frequency and mode on which ***HamLink*** was left. Once ***HamLink*** accepts the code, you will hear the receiver in your earphone. Refer to the command list and test our unit. Don't stay on too long as there are many others who would like to access ***HamLink***.

Change to the band and/or frequency you want to monitor, using the #2nnnn# command. Use the keypad commands above to vary the VFO up or down in frequency.

Note that when the command is not framed with the pound sign (#), ***HamLink*** knows that it is a frequency control command. You can move up in frequency 1 kHz by depressing the "1" key by itself, for example.

You will note from the listing that the pound sign key(#) proceeds and follows each command, other than up/down frequency control. If ***HamLink*** receives the tones indicating #, it knows that the numbers following represent a specific command. When ***HamLink*** sees a second # it knows that is the end of the command string and it should act on the command. A single beep means the command is acceptable. Three short beeps means ***HamLink*** does not understand the command. If the command is not proceeded by a pound sign, ***HamLink*** knows this is an up/down frequency control command.

If you have any problems with the demonstration, call us at (206) 882-2837 from 8:OO AM to 5:00 PM PST, weekdays.

Specifications

Power- 117 VAC or 8.5 to 13 VDC
Temperature- 0 to 35 degrees C
Size- 8" (W) x 5" (D) x 2" (H)
Weight- 2 pounds

Radio Interface

Any Icom HF, VHF, UHF, or receiver with a CI-V computer port. (Optional computer interface not required)

Any Kenwood HF, VHF, UHF, or receiver with a computer port. (Optional computer interface not required)

Yaesu FT890, FT-990, FT-1000, FT-747GX, FT-757GXII. (Optional computer interface not required)

Software Initialization by Owner

Password- Any 4-digit code
Answer Mode- Answering mode or number of rings before answer

Additional Specifications

Indicators- Power, Phone line off hook
Adjustments- None

ARE reserves the right to change the specifications at any time.

Equipment and Accessories

ARE-60 HamLink

Options

ARE-80
CW Link- Allows high speed keyer to be used at user end of the link to send CW. Also allows the use of a Yaesu YH-2 headset/boom mic or the use of a stereo headset.

ARE-61
ICOM Cable- Allows any radio with a CI-V computer port to directly plug into ***HamLink***

ARE-62
Kenwood Cable- Allows any radio with the computer port to directly plug into ***HamLink***

ARE-63
Yaesu Cable- Allows FT-890, FT-990, FT1000, FT-747GX, and FT-757GXII to directly plug into ***HamLink.***

ANTENNAS!

Ever wonder why a commercial antenna lasts 20+ years and your ham antenna maybe 5?

Commercial TV antennas are made from steel and in a few cases hard aluminum. That helps considering our ham antennas are made of aluminum wire in most cases and tubing for booms and larger elements.

Hams also do not take care of their antennas as commercials users do. True, we may be influenced by the thought that we will want a bigger antenna in a few years so why bother, but if you want your antenna to last, you need to protect it from the elements. It has been written often to apply a coat of Crylon clear paint (tm) to your completed antenna. My personal experience has been that this wears off in a few months.

Commercial antennas are painted with a heavy paint coat. You can buy and apply the same paint to your antenna. An RF insensitive paint will last many years many are known to last 20 or more before repainting. You can get the same paint at a local Sherwin Williams paint store. It is known as METALATEX semi-gloss paint. There is both a primer coat and a finish coat. The only surface preparation is the antenna should be clean and any rust brushed off. If you are painting aluminum, it cannot be fully corroded before you paint it. It should be clean and may be slightly oxidized, which should be cleaned to bright metal chemically or mechanically. Do not use steel wool! Steel wool can leave microscopic "hairs" which short out insulators. The paint was about $15 a gallon locally. KB9FO.

BRITISH TO CHANGE TO NTSC FORMAT NEWEST HDTV DEVELOPMENT

DATELINE: The Royal Broadcast Palace

In a surprise move the British Government announced today that the BBC will begin testing NTSC as the next step towards a united Europe and HDTV.

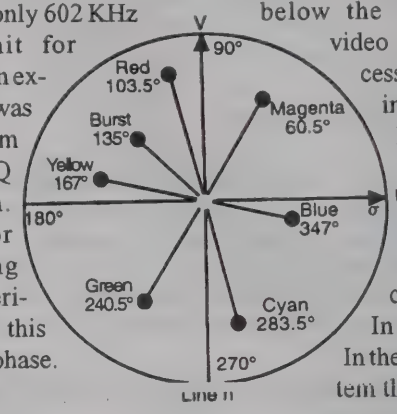
Citing the advantages of the NTSC system over the PAL system, the BBC said they expect to increase the vertical resolution by 100%, doubling the number of scan lines and extending the horizontal bandwidth to 1820 pixels from 405 pixels. In addition the colour bandwidth will be increased 100% to provide for better definition of the color components.

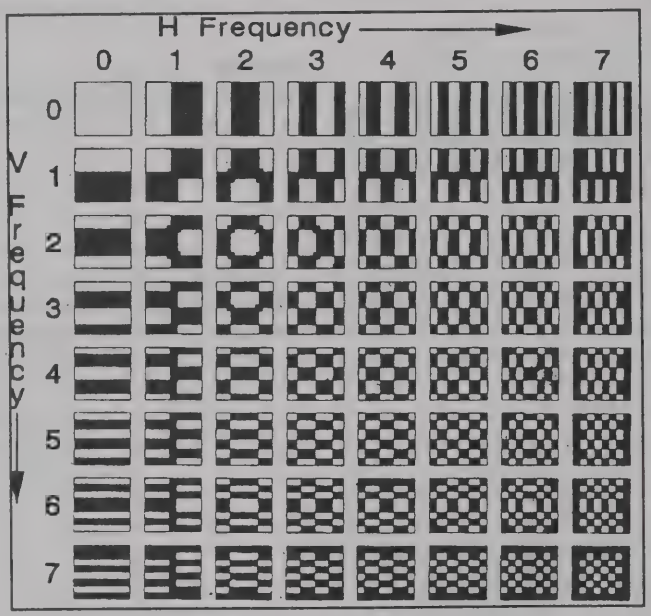
HOW IT WORKS

In 1954 in response to the USA's efforts to provide a compatible colour transmission standard the BBC set up its own secret division to study various proposals for colour transmission. This secret division was known only to top officials and funded through G3 as a covert operation. To confound industrial spies the division was also known as NTSC so that anyone who might accidentally stumble upon any documents would believe it to be an American TV system and discard them without reading them. The NTSC division (New Television System Consortium) was thus born and worked in secret until today.

As any television engineer knows, all television is displayed in an analog format. The CRT and scanning circuits provide a continuous signal to the phosphors of the tube which has roughly a logarithmic response converting the electron beam to visible light. In order to take full advantage of the infinitely higher resolution of the analog display the digital circuits were developed to increase horizontal, vertical and colour information from the source. Modern picture tube developments (compared to 1954) allow for scanning systems of over 2000 lines, a four fold increase over standard television systems of today.

The colour system was the first major improvement. The various systems today limit color to 1.5 MHz bandwidth in the encoding process and further limit the color signal to .6 MHz in transmission. This is due to the poor positioning of the colour subcarrier at 3.58 or 4.43 MHz. In transmission the bandwidth of all video is limited to (in the US) 4.2 MHz in order to insert the aural carrier. The colour subcarrier at 3.58 MHz is thus only 602 KHz below the upper frequency limit for video and thus all frequencies in excess of 600 KHz are lost. This was improved by a system known as UV or IQ modulation. UV standing for unvarying and varying and the obstinate Americans calling the clone of this In phase and Quadrature phase. In the new British NTSC system the IQ modulation technique will be used and will form part of the systems name. The new subcarrier frequency will be 2.77 MHz which will allow 1.43 MHz of spectrum room in the US version and 3.73 MHz of colour bandwidth in the British NTSC system which will retain the 6.5 MHz sound carrier frequency although 5.12 MHz was suggested in order to be fully digital.





As seen by this diagram, the interlacing of horizontal and vertical scan elements produces a checkerboard pattern. However, as the number of elements increases it is easily seen that the size of the patttern decreases. In the NTSC HDTV format described here the pattern becomes gray with a sligfht ficker and the flicker is eliminated by reversing the scan direction on alternate fields causing the eye to blend the two oppposing fields into a pleasing flat field display shown in the figure below.

The second major system improvement was recognizing that the horizontal and vertical frequency components of the normal interlace scanning system could be digitally separated and transmitted as separate signals within the same bandwidth as currently used.

In the new NTSC home receivers, the scanning system will be digitally developed to scan the horizontal and vertical frequency components separately. This will eliminate the visual scan line effect now in all TV systems. Horizontal frequency components will be scanned top to bottom in a two field system with full interlace to convert from 405 lines to 910 lines thus doubling the horizontal frequency bandwidth. However, there is additional benefit since the H and V components have been separated using the Standard Yugosee Nyquist Comb filter.

The separated H/V components are digitally processed and through a system of oversampling and sub Nyquist

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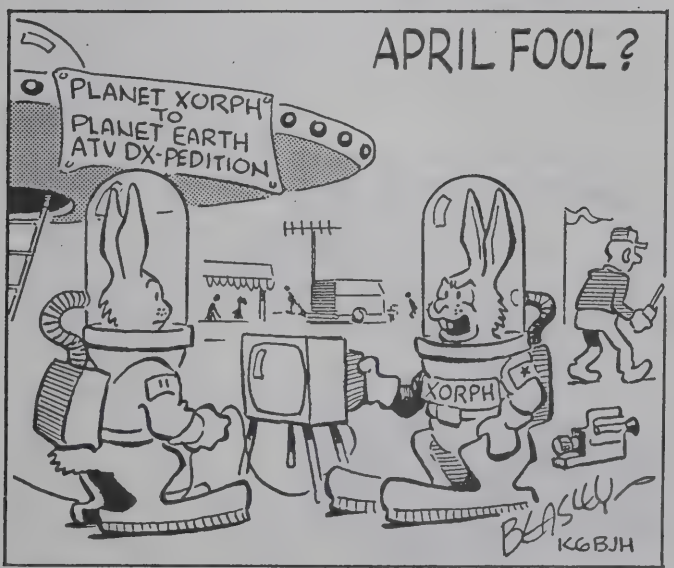

RABBIT EARS? RABBIT EARS FOR TV RECEPTION? HE'S PULLING YOUR LEG!?

DAYTON BOOTHS 66, 67

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1691 MHz Loop-Yagi Antenna model 1691-LY(N)	$ 99
1691 MHz Loop-Yagi Extension model 1691-LY-XTN	$ 85
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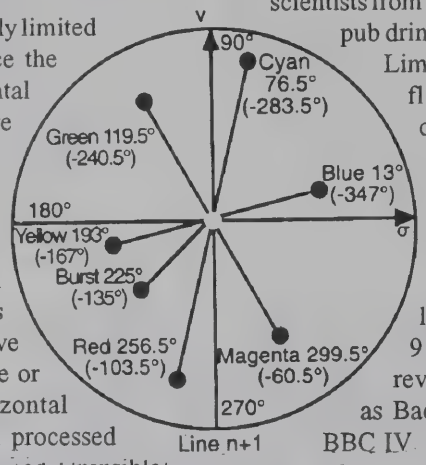
BRITS CONVERT TO NTSC!

processing, the horizontal and vertical components are doubled for transmission, thus the 910 lines will have 1820 lines of information, a four fold increase in resolution. In order to take advantage of the 2000 line scanning ability of modern CRT's, the horizontal information will be displayed as adjacent pixels by scanning the information vertically, thus allowing for 1820 vertical lines for horizontal resolution of active video and an additional 180 lines for the digital encoding information provided by the Standard Yugosee Nyquist Comb or SYNC information. This process is known as Linear progressive interlace Orthogonal scanning, or LO.

The vertical resolution has been effectively limited in the past by the number of scan lines. Since the scanning is now done vertically for the horizontal information and the scan line is analog, therefore having response only limited by the beam landing spot size, the vertical resolution can also be improved by 100%.



Keeping in mind that the SYNC system has separated horizontal and vertical signal components, and the horizontal signal components have already been processed, using the subtractive process the vertical components are the residue or left-over information not used in the horizontal processing. This negative information is then processed through the UV system which has been re-named Unvisible/ Visible to distinguished from the PAL color UV modulation. The Unvisible vertical components are hidden in between the visible horizontal components in the transmitted signal, much as the colour subcarriers are hidden in between the horizontal SYNC frequency components.

In the new NTSC home receiver, the Unvisible signal is processed much as the Visible signal was processed. The scanning system presents the vertical information in a series of adjacent horizontal lines to allow for the now 1820 vertical resolution points. The scan system again allows for 1820 active pixels and 180 pixels for SYNC digital encoding information. This is the same as the Linear progressive interlace Orthogonal scanning system used to present the horizontal video components except the scan beam has been rotated 90 degrees to present vertical video components. Again the system is called LO. In summary the vertical components are scanned horizontaly and the alternate field presents horizontal elements scanned vertically. This is also known as the cross field scanning system.

In respect to the PAL system (Phase Alternate Line) scientists from the engineering physics lab (often seen at a local pub drinking Marguerites and saying, "Please, Another Lime eh?") devised a way to eliminate annoying flicker. In the British NTSC system the combination of 50 horizontal and 50 vertical fields per second produces a slightly discernable flicker in a checker board pattern caused by the alternate field horizontal and vertical scanning.

This was reduced somewhat by the interlace system, first scanning the 405 odd lines and then the 405 even lines to produce the 910 line scans of each H and V signal. This reversed alternate scanning process will be known as Backward Beam Composite Interlace Video or BBC IV or B4 (pronounced before). By reversing the scan on alternate frames the checkerboard effect is reversed for each pixel and the combination of phosphor persistence and human persistence of vision blends the LO IQ system into a flat field display.

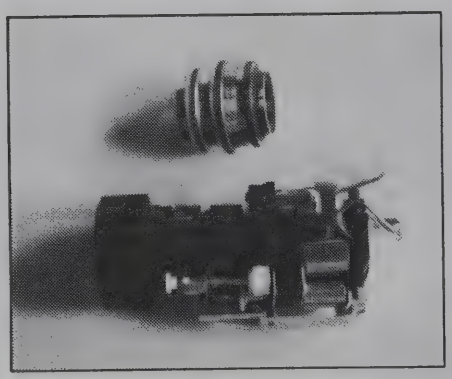
Thus the British have also conquered another problem of CRT's which have rounded face plate by producing a flat field display. As an added feature, when placed in an upright position it is suitable for various social party games since cards and dice will not roll off as they would on a rounded face tube.

Lirpa Loof OF9BK

Gimme a Light... Lens that is!

Heru W3WVV

As an aside to your comments on the weight of lenses in an earlier ATVQ, I have a six to one zoom lens for one of the new 8mm Camcorders and it weighs 103.2 grams with lens cap and shipping cover. While the F 1.9 one inch focal length C mount lens from my 16mm Pathe movie camera weighs in at 136.3 grams. Would it not be nice if the picture from an ATV balloon was in color and the auto iris kept the light correct and the barometer made it zoom out as it went up? This lensis all plastic including elements and has 3 motors included in the weight.



SATV TOODAI

SINDUSTRY SNOOZELETTER

Sciolistic Apostasy Tergiversation Valutudinarian

Our Motto:

We can't print this, it's too close to the truth!

E-X-C-L-U-S-I-V-E

PROOF ALIENS VISIT EARTH!

SETI LABS Dayton, Ohio

At a press conference held today at the Secret Earth Terreform Investigations Labs, evidence was displayed that proves Aliens have landed on Earth and invaded business offices of publications seeking data on humans. Photos taken by secret surveillance cameras show the aliens at the SATV offices, investigating computers and electronic communications equipment and various animals. SETI described the Aliens as dangerous with limited vocabulary and carrying weapons. The weapons were described as small boxes with numerous buttons and a digital display connected to metal whips which emitted dangerous electric and magnetic currents which cause burns and death to humans if brought into contact with bare skin.

The photos and government investigation came about after evidence of multiple visits had been discovered at the SATV offices. Regularly shaped pieces of paper with odd inscriptions and small round metal objects were found scattered about. The numbers on the metal objects were deciphered as dates which showed visits over a span of several years.

After the evidence of the visits was discovered, plans were made to capture the Aliens for study using sophisticated photo and video techniques used by the military and scientific personnel. Cameras were placed in stratigic locations to observe the places which had been frequented by the Aliens. The media was alerted and local TV and print reporters were placed on stand-by should the Alien creatures make another appearance.

Studies in other countries confirm that a pattern had developed in the Aliens visits. This would be the first time a regular visitation schedule had been discovered since the earliest reports in Peru, Egypt and Easter Island. Reports also confirmed multiple visits around the country, especially in Ohio during late April. Apparently the Aliens had gathered here on an annual basis.

Russian scientist Alexander Badenufsky, revealed that they were secretly working on this puzzle for decades and had launched several low orbit satellites in an attempt to intercept Alien communications. It is now known that these Russian satellites logged thousands of intercepted Alien conversations and secret coded transmissions known as More Ess.

After U-2 flights in 1959 confirmed the Russian interest and satellite launches, they were followed by American, Japanese, German and French launches of more secret satellites. The information on these spy satellites now released under the Freedom of Information Act, prove the existence of the Aliens and millions of conversations between them. The American secret satellite program was operated under the code name Orbital Satellite Capturing Alien Reconnaissance or OSCAR.

The OSCAR spy satellites were assembled in scattered locations then assembled in a central location at the National Alien Search Alliance (NASA) labs in Texas and Florida. These satellites were stow-a-ways, hidden with larger commercial satellites to disguise the launching of these spy satellites.

SATV has obtained exclusive photos (next page) of several Aliens who were captured on film and video by amateur photographers and video operators. These images were circulated among a select group of scientific investigators privy to top secret information. These individuals, under special license from the government, known as Hazardous Alien Monitoring or HAM, utilized frequencies assigned only to them by the government and were only discovered by a few individuals who had special scanner radios able to tune the HAM frequencies.

Japanese scientist Yugosee Notenna, found evidence that these HAM operatives have been gathering annually at the Alien landing place at a secret storage facility near Dayton, OH. These scientists exchanged information about the Alien radio signals known by the cryptic code name DX. The investigators formed three subgroups, Hazardous Facilities (HF), Very Hazardous Facilities (VHF), Unknown Hazard Facilities (UHF).

There was also discovered a very obscure group kept in utmost secrecy, known only as Secret Habitat

ALIENS INVADE OHIO

ELVIS SEEN ON TV

CENSORED FOR NATIONAL SECURITY

Photo of Alien interrogation device.

Photo of Aliens invading ATVQ offices.

Facility (SHF). It is here that the rumors often denied by the government of captured Aliens and Alien craft have always begun. SATV has learned exclusively that the SHF was used to interrogate captured aliens. Complicated electronic equipment was connected to the Aliens hands and head. The captured alien was then subjected to microwave radiation and interrogated. A limited vocabulary was established. Digital audio tapes were made and processed. The government believes the Aliens repeat the same phrase which seems to refer to an old earth male. The message was deciphered as, "five nine old man." The reply from another most frequently heard apparently gave the age of the old man and expressed faulty information about earth animal species. The decoded transmissions were heard as, "five nine old man, 73, sea ewe the ox." Also heard was a repeated phrase "queues are dead." Apparently the aliens also tested their equipment regularly as the phrase, "See you com test" was heard most often.

The Aliens also seemed to have a currency and were engaged in games of chance called "Sweepstakes" in which the Aliens apparently attempted to win a prize by contacting the most earthlings possible during a specific time period.

Further investigations continue to unravel the secrets of these Aliens. Readers should report sightings to the nearest SETI office or attend the SETI conference in Dayton, Ohio the last weekend of April.. (continued on page 94...)

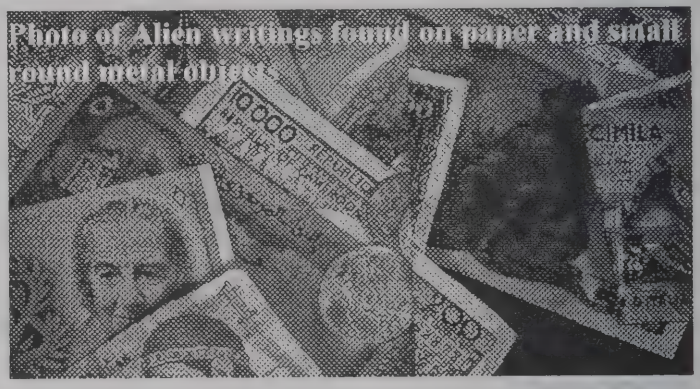
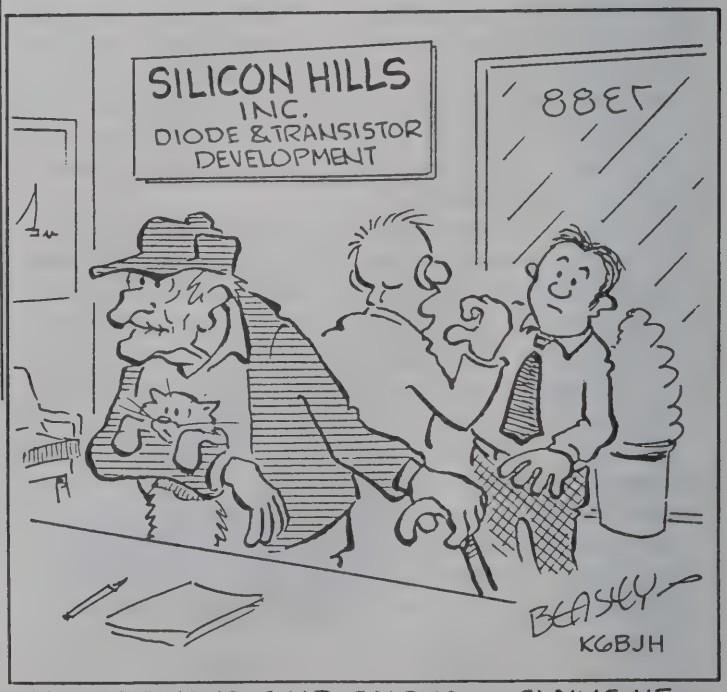


Photo of Alien writings found on paper and small round metal objects.

Lirpa Loof



SAYS HIS NAME IS MR. GALENA --- CLAIMS HE INVENTED THE FIRST SOLID STATE DEVICE AND HIS CAT DEVELOPED THE JUNCTION

SPECIAL EVENT STATION

The London, Ontario ARC will operate CJ3-LON from a hot air balloon on one of the following evenings: June 15, 16, 17, 18 and the morning of June 19th in celebration of London Ontario's 200th birthday. The frequency will be 146.52 and 446.00 simplex. and FSTV on 439.25 TX only. For commemorative QSL, send QSL and SASE to: Anthony Drawmer VE3SQU, 55 Briscoe St. West, London, Ontario N6J 1M4, CANADA.

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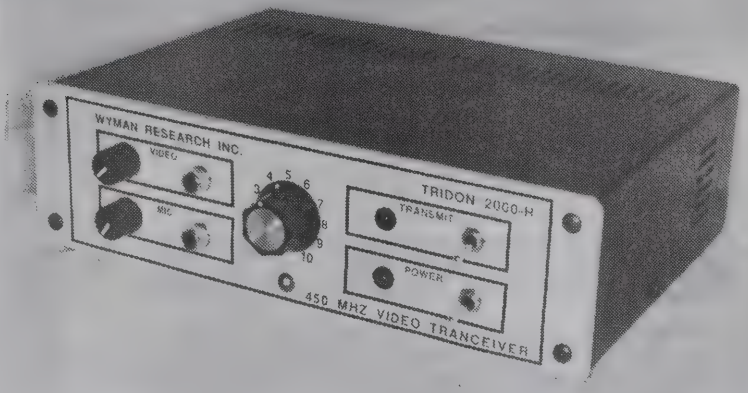

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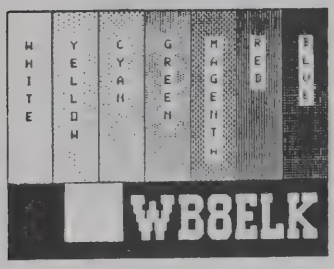

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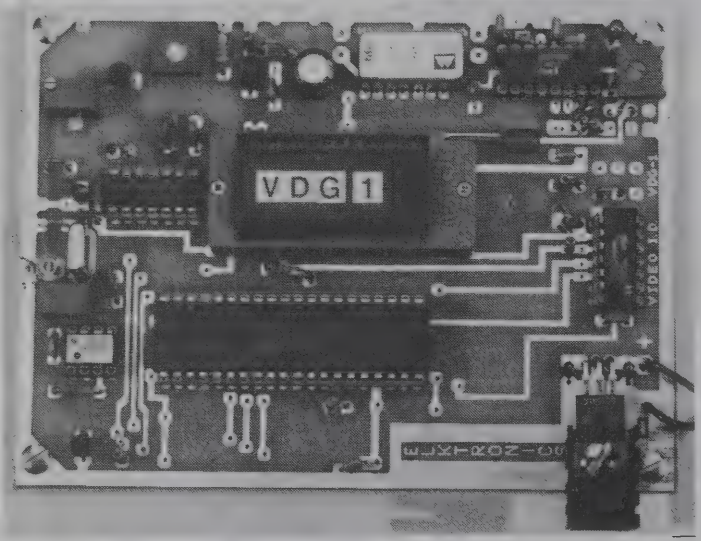
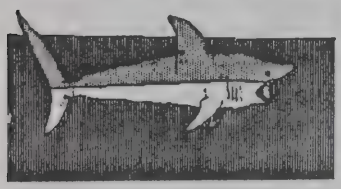
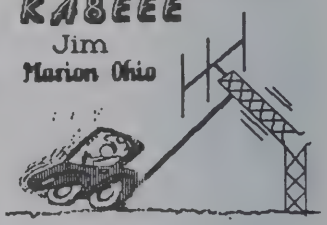


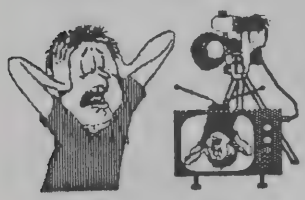
KA0JAW



KA8EEE
Jim
Marion Ohio



N9CAI /r



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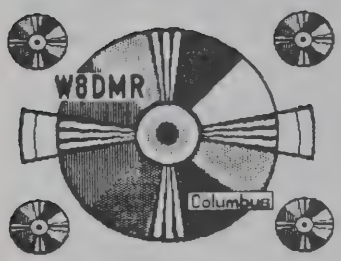

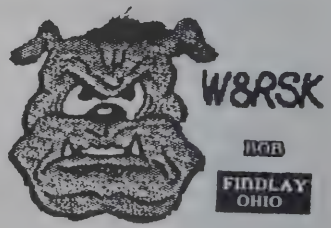

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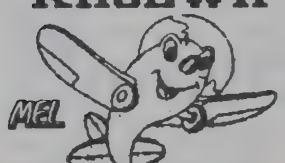
KA8LWR



IN BUCYRUS, OHIO

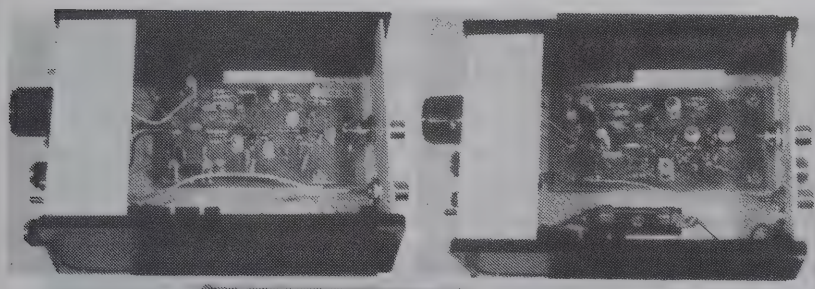
KA8WLV
WHERE NO ATV'ER
HAS GONE BEFORE

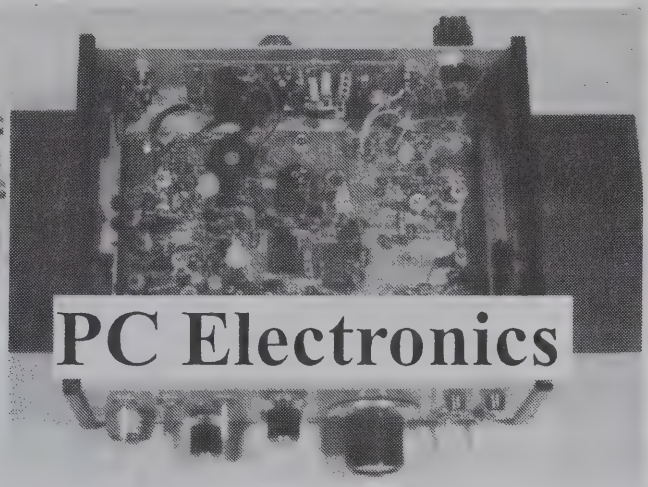
INSIDE ATV

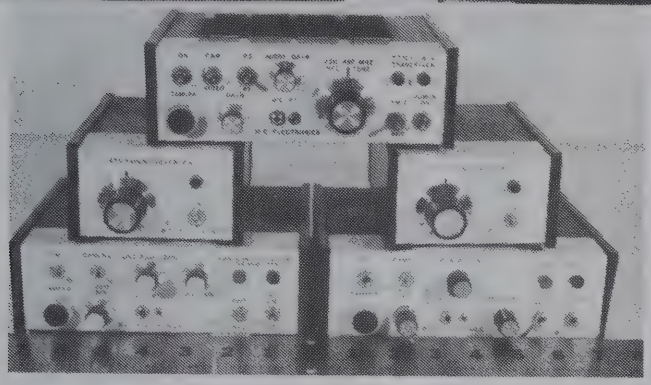
ATV Equipment has come a long way since the T-44 and 80d's. Today's equipment offers a variety of features, AM or FM operation, sub carrier or on-carrier sound, and operation on 440, 900 and 1250 MHz. Here is a look inside of the equipment you are likely to see at Dayton. So leave your tweeker in your pocket!

ATV WORLD

ATV World is a new supplier of equipment. They currently offer equipment for AM mode with multiple frequency operation and power at 1 watt and 15 watts. New equipment is on the drawing boards and in the lab for digital synthesis frequency control and multi-band operation in one box. **Pictured, the ATV-5TR 10 watt transceiver.**



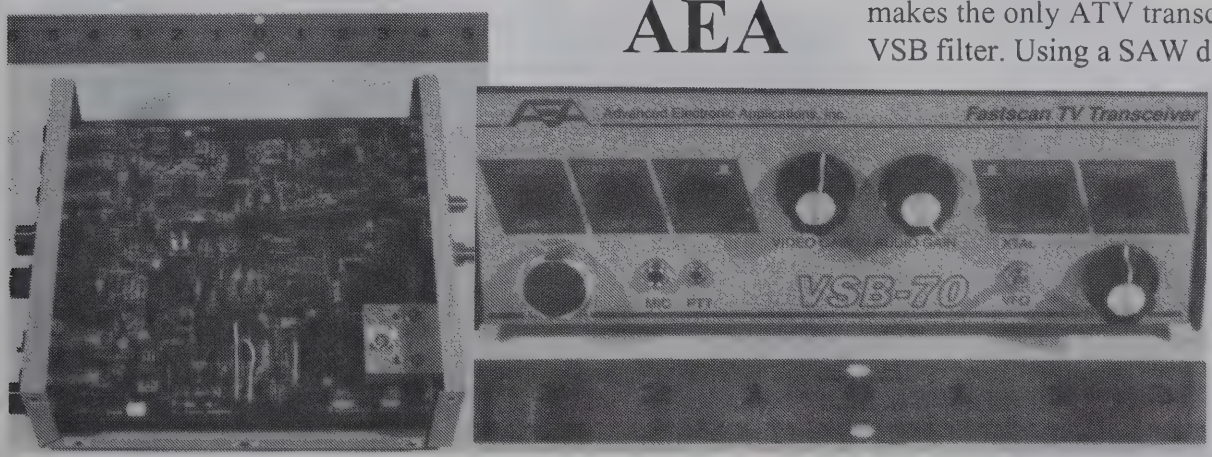




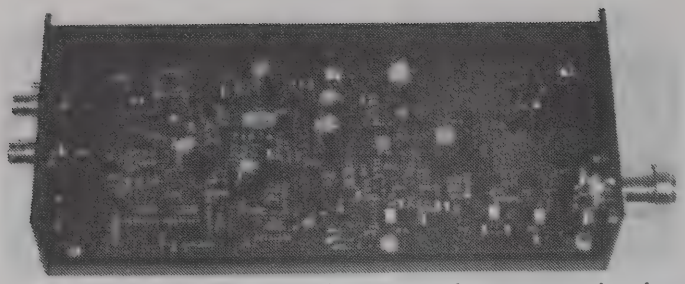
PC Electronics has provided equipment for over 25 years and offers the most complete line of ATV equipment of any manufacturer. Pictured here are two down converters and the trusty TC-70. The newest model is in a Hammond diecast box. The "stacked array" shows how you can put together a complete 3 band station in a compact package. PC also offers amplifiers, antennas, repeaters and a collection of station accessories. **Pictured: TX33, TX23, TVC9G, TVC12G, TC-70-1e.**

AEA

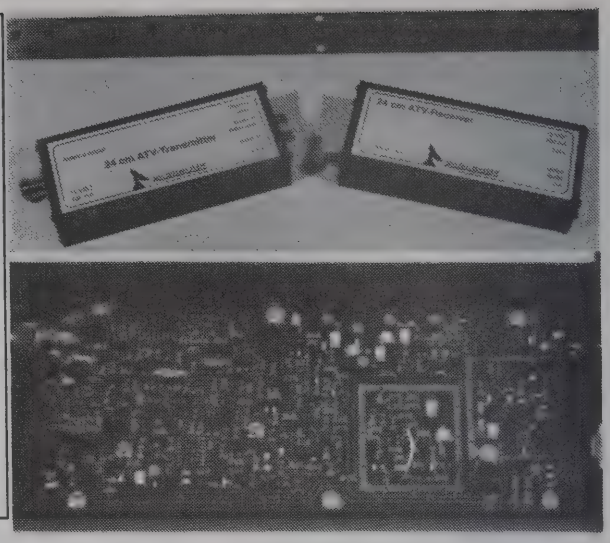
AEA, best known for packet and antennas, also makes the only ATV transceiver with a built in VSB filter. Using a SAW device, the units have both crystal and tunable receive with 1 watt output with very clean spectrum. A matching ATV yagi antenna is also offered.



Pictured: VSB70 transceiver.

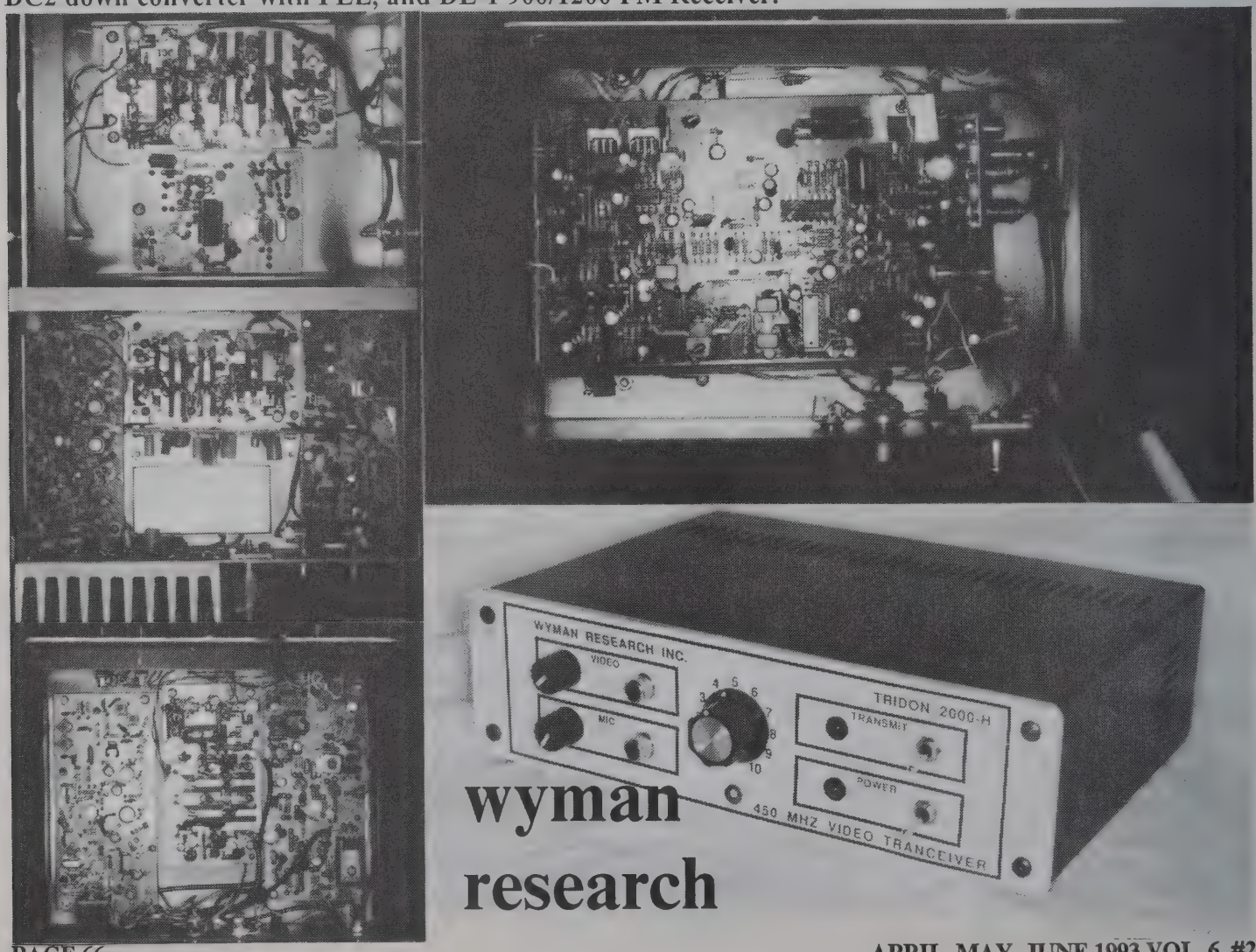


PARABOLIC



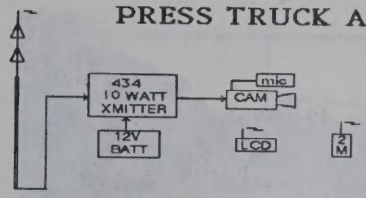
PARABOLIC offers "military" grade construction in very compact transmitter and receiver for 1250 MHz FM mode ATV. The units which will be reviewed in the next issue of ATVQ, offer commercial broadcast quality video and audio. Designed for linking operation, they can also be used as a transceiver. These units are now being offered in the USA and are popular in Europe due to their superb construction quality. Frequency selection is in 1 MHz steps on transmit, covering 40 MHz of the 1250 band, and receive is tunable. **Pcitured 1250 MHz FM TX and RX**

WYMAN RESEARCH is offering a new line of ATV equipment, both AM, FM, for all popular bands, with power up to 12 watts. Receivers can be tunable or crystal controlled, transmitters use frequency lock loops, with relay TX/RX switching and RF sample video monitoring on transmit. Also available are amplifiers, preamps, antennas and other station accessories. **Pictured: new Tridon 2000H 12 watt transceiver, Tridon 2000 3 watt transceiver, DC2 down converter with FLL, and DL-1 900/1200 FM Receiver.**



wyman research

PRESS TRUCK ATV MOBILE



Equipment

434 MHZ isopole antenna
15 ft coax
5 ft pole
Bunge cords
TC-1 ATV transceiver
Power cable
RCA video camera
Power/video cable
External lapel mic
LCD TV
12 volt 15 amp hour battery
2M hand held

Operation

Stake out your operating position with the other press personnel.

Start test transmissions at 0645 and stop after a few minutes to see if Point Sur has any comments.

Check to see if the transmissions had any effect on the press personnel equipment. Make arrangements if problems occur (we were asked to provide this sevice and are expected to operate).

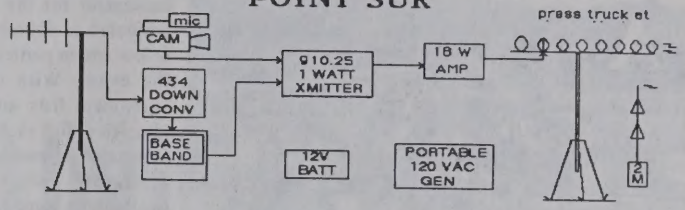
At 0655 begin transmissions.

Annotate all event activities and what you are doing and give the net a heads up before securing transmission through the lapel mic.

Stop transmissions periodically to take a brake and to receive information (about ever 5 minutes or so).

Stop transmissions when approaching Hurricane Point. Wait for directions for further video. Also recommend any video opportunities to Point Sur.

POINT SUR



Equipment

434 MHz 12 element yagi
9913 15 ft coax
5 ft pole
Bunge cords
910 MHZ 19 element loop antenna
20 ft Heliax
20 ft extention pole
4 guy wire tie downs
434 MHz down converter
power cable
F connector coax
CONTEC TV
F connector transformer
Power cable
910 MHz 1 watt transmitter
Power cable
Coax to linear amp
910 MHz 20 watt linear amp
Power cable
Video camera
12 volt 50 amp hour battery
Portable gas generator
2M transceiver

Operations

Start test transmissions at 0530, test reception with Hurricane Point about 0615 and with Press Truck at 0645 and pass on test results to truck.

From 0655 begin repeater ops.

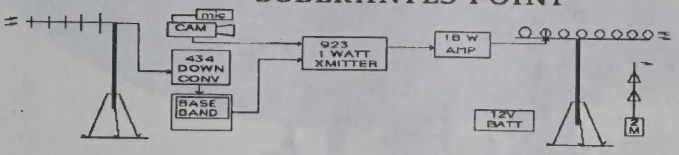
Follow truck toward Hurricane Pt. and switch over to Hurricane Pt. to catch lead runners coming up the hill.

After the truck passes Hurricane Pt. listen for the truck requesting transmissions. Alternate sites.

Once truck is out of good signal range (17 mile point) then begin video operations.

Monitor truck video and pass on any ideas during truck's video brakes.

SOBERANTES POINT



Equipment

434 MHz 6 element yagi
15 ft coax
5 ft pole
923MHZ 19 element loop antenna
3 ft extention pole
3 ft antenna tripod
Bunge cords
434 MHz down converter
power cable
F connector coax
CONTEC TV
F connector transformer
Power cable
Video/audio phono plug cable
923MHz 1 watt transmitter
Power cable
Coax to linear amp
923 MHz 20 watt linear amp
Power cable
Panisonic video camera
12 volt 24 amp hour battery
2M transceiver
Milk crate to hold equipment
Use bunge cords to hold antenna tripod to the heavy crate.
Magnetic compass (326 M to Cypress)

Operations

On station no later than 0515. Park car facing north for easy exit at finish.

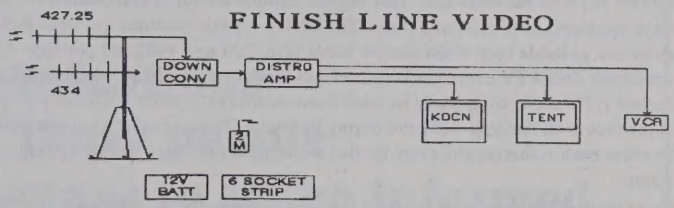
Start test transmissions at 0600.

From 0745 begin repeater ops.

Once truck is out of good signal range (23 mile point) then begin video operations.

Monitor truck video and pass on any ideas during truck's video brakes.

FINISH LINE VIDEO



Equipment

427 MHz 10 element yagi
25 ft pole (stepped to some support)
25 ft coax
434 Scora antenna
20 ft coax
Tuneable 430 down converter
Power cable
F connector coax
TV distribution amp
100 ft F connector coax (KOCN)
10 ft F connector coax (TENT)
RCA TV (TENT)
TV (KOCN provides)
RCA VCR
6 socket power strip
100 ft extention cable
12 volt power supply for 12 volt systems
2M transceiver

Operations

Cypress Point is a control station. Coordinate with Cypress for any Race Office) requests.

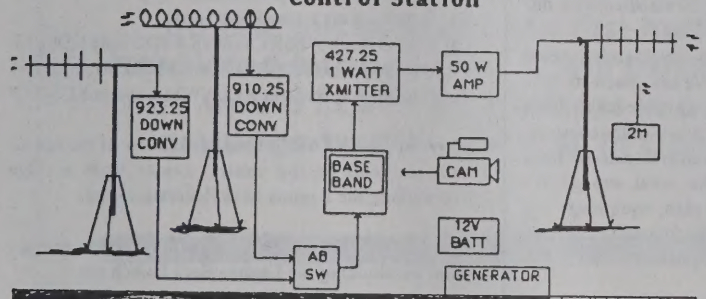
Any requests by KOCN may be difficult to solve, because communication with Press Truck is very difficult (near field effect prevents good comms with 2M hand held).

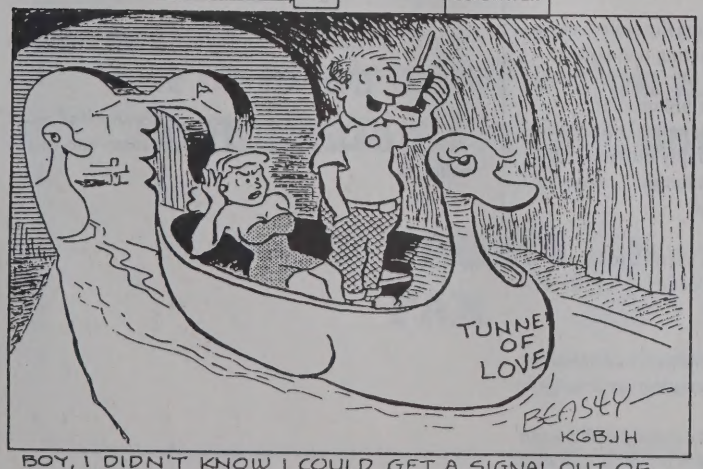
Do relate to cypress on video camera techniques ie. panning too quickly, too much sky killing contrast, or any thing which seems correctable!

Be ready to test by 0530.

Primary 147.43 for down coast.
Secondary 144.34 to Cypress.

CYPRESS POINT
Control Station





BOY, I DIDN'T KNOW I COULD GET A SIGNAL OUT OF THIS PLACE --- HEY, THIS IS GREAT!

The Hot Air Affair

The Hot Air Affair event requires what I call a "parallel" ATV reception path (all transmitters sending to one control site), while the Big Sur Marathon requires a "serial" ATV reception path (signal A going through repeater B and repeater C to arrive at station D). Both of these events have taught us a lot about ATV capabilities. We have learned from our successes and failures and improved our capabilities. Since our 1989 start in supporting these major public service events, we have found limitations and we have found new solutions. We have become proficient in point to point and remote base repeater operations, which always impresses the ARES coordinators during disaster drills when they see P5 video at the command center.

The Hot Air Affair is a three day hot air balloon event held in February at the Laguna Seca Recreation and Raceway in the Monterey area. Laguna Seca is a crater shaped valley that is 200 ft. below the encircling ridge line. In this event we transmit video from the ridge lines into Laguna Seca so the event leaders can see outside of the crater to monitor the sunrise and where the fog is (or isn't)! This has helped ensure appropriate start times for safe launches. Once the balloons are launched, the event leaders are able to monitor where ALL the balloons are going and direct chase crews for recovery. Additionally, the event leaders wanted ATV from a balloon to provide a unique safety of flight observation platform for spotting any unexpected problems.

The Hot Air Affair has been 100% successful for the last four years. This is attributed to following the guidelines given below and in particular to field testing before the event. With detailed line drawings, equipment lists and operating procedures identified for each station, a field test is conducted to ensure that P5 performance is achievable. Failure is usually attributed to overlooking some minor detail and is usually an easy matter to solve.

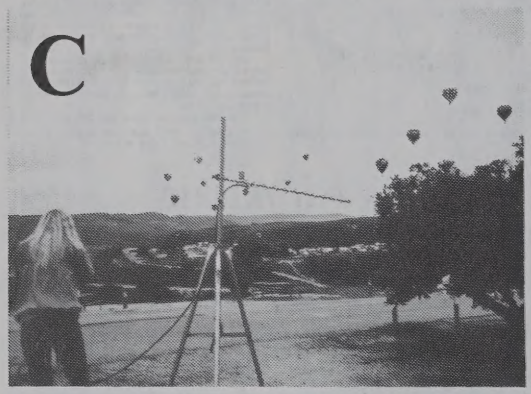
The Big Sur Marathon

The marathon is a one day event held each April. The runners start at Big Sur, CA and run 26 miles to the north ending up in Carmel Valley. This 26-mile event is a "straight line" run on the Pacific Coast Highway 1. If you have ever been on Highway 1, you know it is anything but straight! The Pacific Ocean is on one side of the highway and a very steep mountain range (2000+ ft.) is on the other side. This rugged 26-mile section is inaccessible to fixed ham repeaters and to cellular phones. The ONLY communications available for this event are portable ham radio remote bases (2m, 220 and 440) and portable ATV repeaters! This ATV event has been and still remains a significant challenge. Each remote ATV site is completely isolated from outside help; what you have with you at the time is all that you will have during the event. To successfully operate during an event such as this (or any event for that matter), the following hints may help your group:

Event planning is absolutely required and breaks down into the following elements:

- Determine publice service need.
- Develop a detailed plan with the resources you have available.
- Coordinate with event leaders to ensure their needs are met.
- Test the full plan well before the actual event.

These sound like common sense (and it is). However, the logistics of testing the full plan with all the equipment and the operators is where we have had our failures. As a result, we have not yet been fully satisfied with our performance at the marathon.

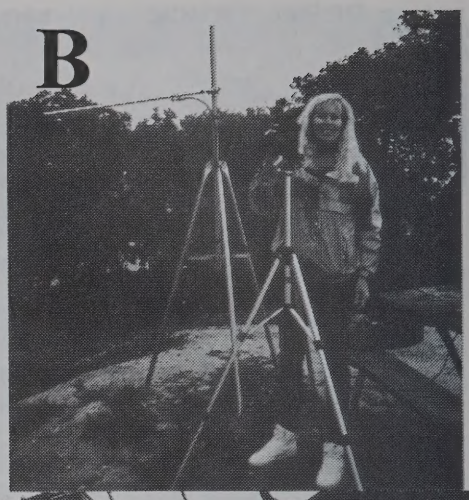


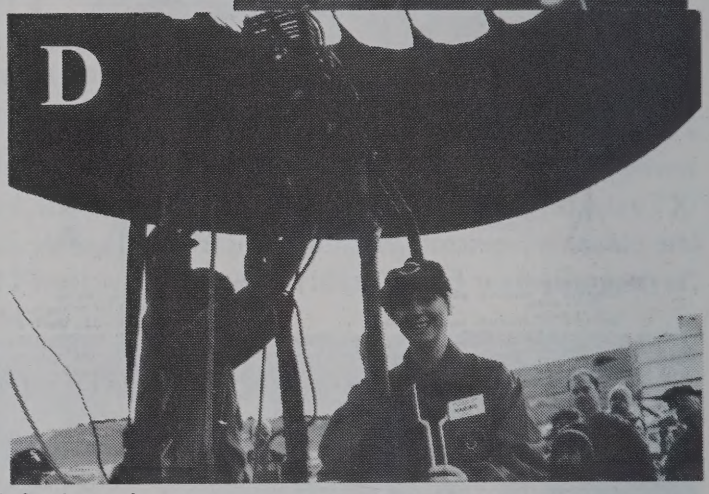
The Big Sur Marathon coverage has never been 100% successful. We have been 10-50% successful in just getting a picture to the finish line on the event day. In pre-marathon testing, however, we have achieved great pictures from all locations tested. What went wrong? We used the same detailed plan, equipment and operating procedures. But, since this is a serial dependent transmission path, any one of the following can have an impact:

- Not having and testing all the equipment and operators in the pre-test.
- Operators not involved with the pre-test, not using the equipment provided and changing the system design just before the event starts (confusing the other stations and making remote troubleshooting impossible).
- Good coax and commonality with connectors (check for intermittents).
- The ability to do on-site repairs (butane soldering irons really help on top of a remote hilltop site).
- Power source with proper connectors and ATV transmitter adjusted to operate at a battery voltage of 12.5 volts vs. 13.8 volts (the 910 MHz pedestal adjustment was particularly sensitive to power supply differences).
- Have a portable TV to monitor your signal (LCD sets work great for this) at each transmitter site to verify that your signal is good. This will tell the receive site that any problem is likely on their end.
- Reduce interference by using antenna gain before increasing transmitter power.
- Cross-polarize antennas for multiple inband transmitters (about 20 dB or about 2 P-units reduction in interference is possible). For example, we used horizontal polarization for 426.25 MHz and vertical for 434 MHz.
- Interdigital (VSB) filters reduce in/cross band interference.

Each item mentioned above came from the College of Hard Knocks! The serial path transmissions are particularly susceptible to failure from any one problem, whereas the parallel path is easy to overcome (you just don't use the bad station).

With the current size and experience of the Monterey ATV community and the support of the south Bay Amateur Television Club we now have enough flexibility to receive video from each remote site during an event with P4 to P5 video about 90% of the time. I hope these hints help your group organize your own successful event!





The following are the Monterey Bay ATV operators with equipment: Doug KC3RL Bev KC6AMI Don KB6BZL Allen KC6VJL Elliot KB3LY Pat KA6IRS Paul KQ6G Mike WA6EOC Smitty K6DYX

The following are trained operators:

Cal WW7G Keith WE6R Charles KN4DG Judy KD6FYL Pat AA6EG Mario KD6ILO Ron KM6DZ Rick K6TST Renei KD6OCP Barbara KC6AWM Charles KC6UXP

Photo A. Don KC6BZL transmits a view of the hot air balloons back to the control center from a ridge overlooking the Laguna Seca Recreation area.

Photo B. Judy KD6FYL operates from another vantage point overlooking the Laguna Seca launch site.

Photo C. The balloons take off as Judy KD6FYL transmits the event back to mission control.

Photo D. Pat KA6IRS prepares to transmit a bird's-eye view of the hot air balloon launch from one of the balloons.

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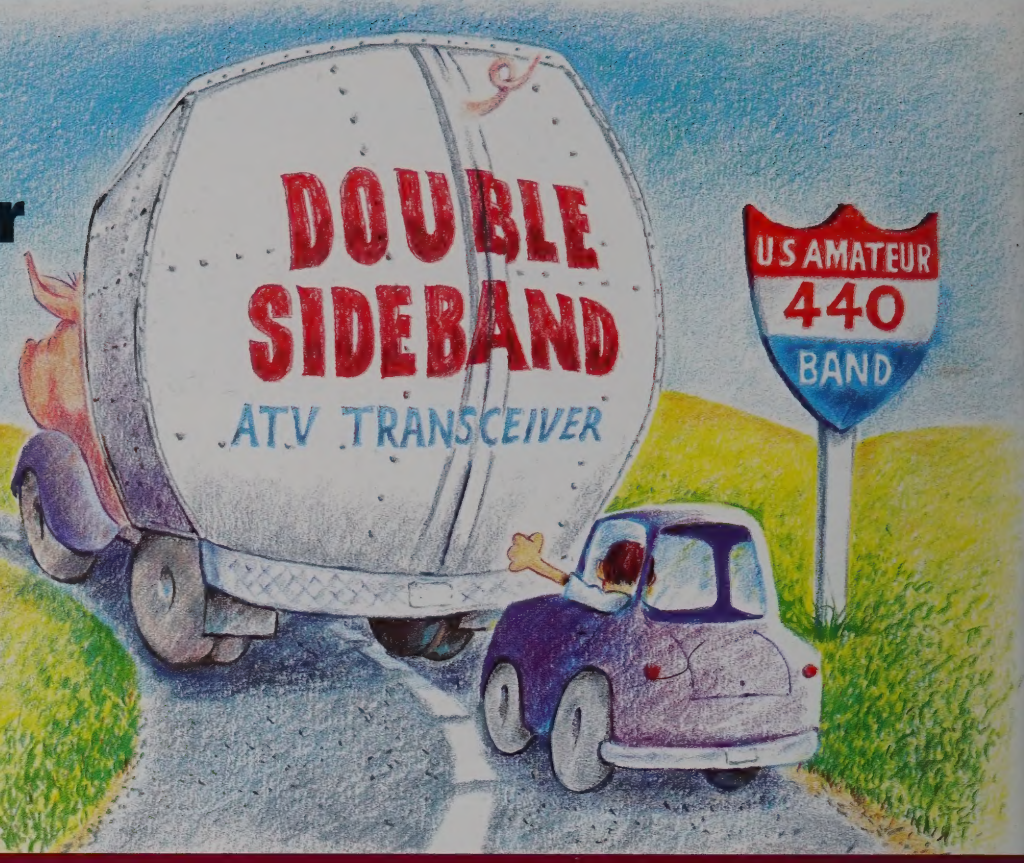
Don't Be An Amateur Band Hog.

If you're using a traditional double-sideband (DSB) Amateur Television transceiver, you're, in effect, hogging the band. DSB not only wastes power on the unused sideband, but uses almost twice the spectrum necessary. Not good, considering how limited the spectrum is to begin with.



VSB-70 with Vestigial Sideband

The VSB-70 from AEA is the only amateur television transceiver that uses Vestigial Sideband (VSB), the same modulation method used by commercial TV stations. Our VSB technology reduces the unwanted sideband over 40dBc! More power where it should be and less wasted spectrum space.

Also available is the RLA-70 mast-mount linear amplifier (with power supply), which boosts your signal while preserving the characteristics of VSB.

Be a good spectrum neighbor. Use the AEA VSB-70 ATV System.

For a complete specification sheet on the VSB-70 or any other product, call 1-800-432-8873.

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